NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA

THESIS

**A FIRST ACCESS
INTERNET TUTORIAL**

by

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June, 1995

Principal Advisor: William J. Haga

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Relatively few people are skilled enough with the various tools provided by the Internet to fully exploit its power. Mastery of those tools can turn the Internet into a potent ally. Currently, no tutorial exists nor is any formal instruction provided relative to the Internet. This thesis reports the results of designing and evaluating an Internet tutorial to alleviate this deficiency. This tutorial was designed for Naval Postgraduate School students who also evaluated it. In a pre/post pre-experimental design, surveys assessed users' familiarity and competence with the Internet before and after employing the tutorial. Results show that a 59 percent improvement occurred in student ability as a result of using the tutorial.

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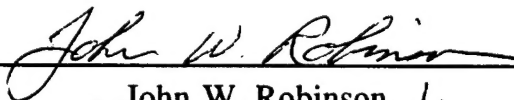B.A., University of South Florida, 1978

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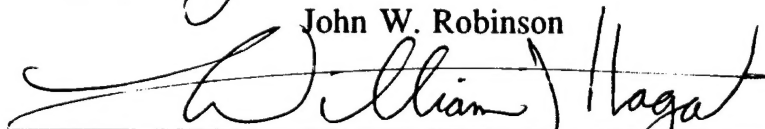
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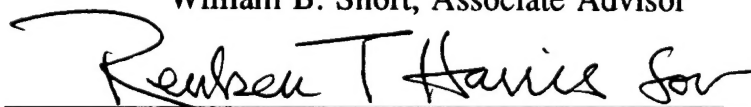June, 1995

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ABSTRACT

Relatively few people are skilled enough with the various tools provided by the Internet to fully exploit its power. Mastery of those tools can turn the Internet into a potent ally. Currently, no tutorial exists nor is any formal instruction provided relative to the Internet. This thesis reports the results of designing and evaluating an Internet tutorial to alleviate this deficiency. This tutorial was designed for Naval Postgraduate School students who also evaluated it. In a pre/post pre-experimental design, surveys assessed users' familiarity and competence with the Internet before and after employing the tutorial. Results show that a 59 percent improvement occurred in student ability as a result of using the tutorial.

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I. INTRODUCTION

The Internet is a concatenation of many individual Transmission Control Protocol / Internet Protocol (TCP/IP) campus, state, regional, and national networks (such as NSFNET, ARPANET and MILNET) into one single logical network all sharing a common addressing scheme (Kehoe, 1993). In layman's terms, the Internet is a master network of networks, originally developed to link research institutions in California and Utah. Over the past twenty years, it has increased in capability, size and complexity. Barlow says, "the Internet has a savage user interface, and a certain amount of hand-holding is required for even the seasoned computer professional," (LaQuey, 1994).

It is complexity which has created the need for a tutorial. The Internet is complex to the extent that the average military officer or computer user, for example the typical Naval Postgraduate School (NPS) student, cannot take full advantage of its diverse capabilities without extra instruction. This deficiency deprives students of the opportunity to take advantage of a state of the art communications and research tool. A majority of students first reporting to NPS have little or no experience with the Internet (Dejong, et al, 1994). Currently, no formal Internet instruction is provided nor does an Internet tutorial exist at NPS.

This thesis solves that deficiency. Research was conducted to determine which Internet services should be included in a tutorial. A tutorial was then drafted and presented to a sample group of students for evaluation. Feedback from several sources was then incorporated into the final tutorial (see Appendix A).

A. BACKGROUND

1. History of the Internet

The Internet is a global network of networks providing a real-time link between universities, research centers with super computers, military installations and various business entities around the world. It is considered by many to be the backbone of the so-called "Information Super Highway (Gore, 1992)." It originated in the late nineteen sixties when the Department of Defense (DoD) set out to establish a computer network

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connecting civilian universities engaged in DoD research. These universities were UCLA, Stanford, University of California Santa Barbara and the University of Utah. As more institutions joined the net, it became known as the Advanced Research Projects Agency Network (ARPANET), then later on, Defense Advanced Research Projects Agency Network (DARPANET). The ARPANET is considered to be the "mother" of today's Internet (Kehoe, 1993).

The military portion broke off in the mid nineteen eighties and became the MILNET. The National Science Foundation laid the groundwork for the Internet during its effort to link super computers with research sites. In 1990 the Internet was in full operation with the military remaining a primary user. MILNET continued to operate for the transmission of unclassified traffic only. (Kehoe, 1993)

2. Size and Growth Rate of the Internet

Nothing like the Internet has ever been created before. The Internet as a whole changes daily, indeed, some users say hourly (LaQuey, 1994). Demand for Internet services is increasing exponentially with the commercial segment being the fastest growing (LaQuey, 1994). Businesses are finding markets in cyberspace and corporations such as AT&T, MCI and Microsoft market Internet access. The electronic frontier is pushing its way into every home and office in America. Table 1 shows how fast the Internet is expanding (USN&WR, 1995). Table 2 clearly demonstrates how large the Internet has become (USN&WR, 1995).

1994 growth in world usage	95%
Nations joining the Internet in 1994	22
Packet traffic in 1993 in trillions of bytes	40
Packet traffic in 1994 in trillions of bytes	80
Growth in business computers connected world-wide in past 3 years	628%
Monthly increase in number of users	1 million

Table 1. Internet growth rate.

Total number of nations interconnected	159
Number of computers connected in the U.S.	3.2 million
Number of computers connected world-wide	72 million
Organizations interconnected worldwide	56,000
Businesses connected world-wide	32,000
Number of World Wide Web computers	10,000
Computer networks connected world-wide	42,000
Estimated number of users	32 million
Number of Gopher servers	5500+

Table 2. Size of the Internet.

This growth has two primary impacts on the tutorial user. First, the user must understand that the picture of the monitor screen he sees in the tutorial may not be exactly the same as what he sees on his monitor as he completes the tutorial. Secondly, as more people use the Internet, the slower the system becomes. When the user executes a command, they should not expect instant response from the system. In some cases, minutes, not seconds will be required for a response. The unknowing user might erroneously assume that his computer has locked up or that the wrong procedure was followed. Another impact of this growth involves books and magazine articles about the Internet. They are out of date by the time they are published.

3. Benefits of the Internet for the NPS Student

The Internet is more than just a computer network. It accomplishes two critical tasks faced by every NPS student - communicating with other people and finding information to help in thesis research.

The communication capabilities of the Internet are without equal. A student can communicate with virtually anyone who has an electronic mail (email) address, even subscribers to the commercial information services such as Prodigy, America On Line and Compuserve. These systems are not part of the Internet, however, special email gateways allow them to take advantage of the email service. Email is the biggest use of

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the Internet far exceeding the other services (LaQuey, 1994). So popular is email that most word processing programs, such as WordPerfect 6.0 and Microsoft's Word, include an email feature. Communication via email is asynchronous since the two or more parties involved do not need to be simultaneously available. Telephone tag is a thing of the past. This benefit becomes apparent when a student can send a professor email instead of waiting outside that professor's office to ask questions.

Communicating with a professor is only the proverbial tip of the iceberg. With the Internet a student can communicate with thousands of people world-wide, day or night through mailing lists or newsgroups. Cyberspace has now moved into outer space. During a space shuttle Endeavor mission in February 1995, NASA provided information on every aspect of the mission, as it was happening, via the Internet. Even the commander-in-chief is accessible by email. This form of communication is efficient beyond comprehension. Email will usually reach its destination virtually instantly. Data travels over the net at speeds up to 45 mega bits per second and faster speeds are achieved almost monthly. Reliability is another feature designed into the Internet by the original engineers who wanted a network that could survive a nuclear attack. If a host computer on the Internet is disabled for any reason, computers at other locations, called routers, will reroute the data packets to the destination using the most expeditious route.

Several Internet tools exist to help a student find information. The most recent are *Mosaic* and *Netscape*, browsers for the World Wide Web. Other tools such as Gopher, Archie, VERONICA and JUGHEAD all provide a user-friendly interface to the three basic Internet services of email, remote log in and file transfer. The Internet has been called the "library of libraries" putting information about any subject at a student's fingertips. It provides a user with educational resources such as super computers and access to the best libraries world-wide, such as the Library of Congress . Every major university in the United States is connected to the Internet (Estrada, 1993). If the mainframe at NPS were not available as the result of an earthquake, for example, a student can use the computer center at the University of California, Berkeley. If a student has a modem and the required software, he or she can use the University of California Berkeley Computer Center without ever leaving home.

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Students at NPS are indeed fortunate to have a computer center available that offers full Internet access. Not only is this service available, but free of charge for NPS students. As of April 1995, some commercial information services charge their customers up to three dollars per hour for limited Internet access. The Internet has been the primary provider of information for this thesis.

B. PREVIOUS INTERNET TUTORIAL RESEARCH

Numerous Internet tutorials exist either commercially or on the Internet itself. Commercial tutorials are expensive, ranging from fifteen to thirty-five dollars, time consuming, and provide an in-depth look at the entire system which exceeds the needs of most NPS students. Time consuming is a big deterrent. One thing that most NPS students do not have is enough time. The curricula are concentrated, leaving most students with little extra time to devote to learning anything that does not relate to curriculum courses. Krol's (1992) *The Whole Internet, User's Guide and Catalog*, exceeds 400 pages. Most students, especially the inexperienced computer user, would not even consider using Krol's book for learning the Internet. Tutorials available on the Internet are free. However, the user must already know how to use the Internet in order to access them. This is akin to giving an illiterate person a book that teaches them how to read.

Two teams of NPS students independently designed and evaluated Internet tutorials as class projects for the Operations Analysis courses 3401 and 3404. In June 1994, the first team of three students designed a tutorial primarily for a home computer environment, that could be considered stand-alone (Bingham, et al, June 1994). In December 1994, the second team of three students designed a tutorial based on the work of the first team (Dejong, et al, December 1994). This tutorial did not reflect state of the art Internet capabilities and proved to be too advanced for a novice user. Additionally, feedback from a sample of students who evaluated the tutorial indicated that several improvements needed to be made.

II. METHODOLOGY

Interviews with 26 NPS students and staff members in the Systems Management Department and the W. R. Church Computer Center, provided insights into the content and scope of this tutorial.

Two Internet tutorials were developed separately by two teams of students in partial fulfillment of course requirements in operations analysis. These tutorials were thoroughly analyzed and provided a starting point for the development of this tutorial. Feedback from students who actually used the class project tutorials and provided comments and criticism was the most important information extracted. The second tutorial was evaluated by students in the Joint Command, Control, Communications and Space Systems curriculum. A majority of whom had extensive experience with the Internet and PC's which diminished the value of their feedback.

A. LITERATURE REVIEW

Five years ago, the books available about the Internet could be counted on one hand. Today, with dozens of Internet books available a considerable effort would be required to determine which are suited for a novice reader. The rapid growth in the size and capability of the Internet is the cause. Only current literature is relevant as the Internet changes faster than books can be written and published.

The Internet itself is valuable when it comes to research on the Internet, offering many resources of information. Each and every tool used on the Internet has a help feature that presents a list of commands with an explanation of how to use the command. Frequently Asked Questions (FAQ's), a file of questions and answers, exist for each tool also. Many directories of Internet services, lists of Internet lists and electronic books can be found in databases easily accessed by File Transfer Protocol (FTP). The latest World Wide Web browsers, *Mosaic* and *Netscape*, come with built-in on-line tutorials that make learning enjoyable and efficient.

B. EVALUATION OF TUTORIAL EFFECTIVENESS

Two methods were used to evaluate the tutorial's effectiveness. The first method involved giving the tutorial to a sample of students and statistically measuring the change in their ability to use the Internet as a result of the tutorial. Written and verbal feedback were also requested from this sample. The second method relied on the expert advice of computer center personnel.

1. Student Responses

A group of students were identified to serve as a sample for testing the tutorial's effectiveness. Subjects were given a short introduction on the tutorial followed by the pre-tutorial survey. Next, they were given the tutorial and directed to complete it at their convenience within the next five days. On the fifth day they returned the draft tutorial with annotated comments and filled out the post-tutorial survey. Appendix B contains the pre and post tutorial surveys.

a. Sample

The tutorial was evaluated by a group of 22 NPS students, from various curricula, all enrolled in the IS 3183 course, Management Information Systems. This course is designed for an information system user, not an Information Technology Management specialist. This sample included a range of computer experience levels and closely matched the target tutorial user.

b. Pre-tutorial Survey

The pre-tutorial survey consisted of two parts. Part one contained eight questions that would establish the level of a respondent's Internet experience, e.g., "Have you ever used the Internet for electronic mail?" Part two contained ten questions. Each question asked a subject to perform a task on the Internet if they had the ability to, e.g., "Use anonymous File Transfer Protocol (FTP) to download a file."

The following Likert-type scale appeared immediately below each question :

No Ability 1   2   3   4   5 Maximum Ability

A subject was asked to circle the number that best represented their ability to perform the stated task.

c. *Post-tutorial Survey*

The post-tutorial survey was similar to the pre-tutorial survey, with a third part added.   Part one consisted of four yes/no type questions. Part two consisted of the same ten questions contained in part two of the pre-tutorial survey. Part three consisted of four questions followed by a request for written feedback.

d. *Statistical Analysis*

All yes/no type questions were evaluated and displayed as percentages of the total sample. Two questions asked a subject if he or she intended to use the Internet for communication and thesis research, before and after the tutorial. These questions were included to see if a change in attitude toward the Internet could be achieved if a subject were more aware of its capabilities. The ten questions relating to a subject's ability to perform various tasks on the Internet, before and after the tutorial, were compared to see if an increase in a subject's ability had occurred. An increase in ability will indicate how effective the tutorial actually is while no change or a decrease will indicate a need for improvements. The independent variable was the tutorial and the dependent variable was a user's ability level. A t-test was used to test the statistical significance of the difference in means between the pre and post tutorial responses.

e. Written and Verbal Feedback

When the subjects were initially briefed on the tutorial, they were asked to annotate the document itself with comments or suggestions, as they proceeded through it. This procedure would preclude a subject from relying on his or her memory. Part three of the post-tutorial also contained space for comments and suggestions and asked specific questions related to the tutorial.

Part one of the pre-tutorial survey asked a subject to provide his or her email address. The author used the addresses to send each subject an email message repeating the request to make comments on the tutorial itself as it was being completed. The message also asked for feedback via reply email if the subject wanted to correspond immediately.

When the tutorials were collected and the post-tutorial survey was administered, verbal feedback was noted as the subjects discussed their opinions about the tutorial.

2. Feedback From Computer Center Personnel

Copies of the draft tutorial were given to two staff members in the computer center for their evaluation and comment. As computer professionals and seasoned Internet users, their feedback had to be taken cautiously given their perspective. They did, however, provide useful feedback concerning the technical and procedural aspects of the tutorial since the tutorial was designed with the computer center hardware/software in mind.

III. FINDINGS

The findings are concise and have practical application. Actually written, the tutorial met the first objective of developing an Internet tutorial. The second objective, evaluating the developed tutorial, was met by collecting subjective data that tested the effectiveness of the tutorial. Section A contains a description of the tutorial while Section B addresses the evaluation of the tutorial's effectiveness. Data collected on the pre and post tutorial surveys are summarized in tables found in Appendix C.

A. TUTORIAL ATTRIBUTES

1. Scope

The developed tutorial is designed for a NPS student based on the hardware and software available at the W. R. Church Computer Center. The general purpose computing platform is the Sun Sparc 10, model 41 workstation, with the Unix operating system. The target tutorial user is a student who has limited or no experience with personal computers or the Internet. This individual requires the most assistance, which is not currently available. The seasoned computer or Internet user has unlimited resources available with the Internet itself being the most helpful.

The objective of the tutorial is to present a high level view of the Internet, introducing the student to its capabilities. Details of the inner-workings are intentionally omitted. We hope, this will pique their interest and the tutorial will serve as a starting point from which a user can begin learning about the full range of benefits offered by this vast network.

Appendix A contains the 49 page tutorial. An on-line, interactive tutorial was contemplated out of the belief that no one learned how to swim by reading a book. They started by going to the lake or pool and getting into the water. This philosophy could be applied to learning the Internet as well. However, a written tutorial offers several advantages not found in an on-line tutorial. For a target user, a written document would be far less intimidating. A document which can be retained and referred to in the future

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is another advantage. Finally, it can be easily duplicated and distributed, to all students upon check-in at NPS.

The tutorial can be completed at any of the Unix workstations located on campus. However, it is suggested in the Introduction that the user complete the tutorial at the computer center where consultants are on duty if assistance is required. The tutorial begins with an introduction to Unix and the Sun workstation. The three basic Internet services of electronic mail, file transfer and remote log in are then addressed. Next, information search and retrieval tools such as Gopher, VERONICA, JUGHEAD, Archie and the World Wide Web (WWW) are covered. The two WWW browsers Mosaic and Netscape are then presented with a brief introduction to OpenWindows. Five Appendices are attached. They are: Alternate Internet Addresses for Exercises; Log in From Home; Unix commands; Email, FTP, Telnet, Gopher, Archie Commands; Useful Internet Information.

Not every tool or service offered on the Internet was covered. Only those tools that will benefit a NPS student. Newsgroups were included in the draft tutorial used by the sample for evaluation. They were omitted from the final version because of the limited academic value they offer to a graduate student. Feedback also indicated that the Newsgroup reader, TRN, was complicated and not user-friendly. Wide Area Information Server (WAIS), is a tool similar to Archie, however, it does not have access to nearly as many files as does Archie. Finger is a common tool for finding out who is logged on to the Internet and includes information about the logged-on user. Many locations have disabled Finger for privacy reasons. The Multicast Backbone (MBONE), provides for real-time audio and video teleconferencing, a service few NPS students will require. All of these tools were omitted from the final tutorial.

2. Stand-alone

A stand-alone tutorial would be the most desirable. Some professors in the Systems Management Department devote classroom hours to a brief overview of the Internet. An effective stand-alone tutorial would allow professors to devote those hours to the course subject matter instead of the Internet.

To enhance the stand-alone nature of the tutorial Appendix B, Log in From Home, was included. If a student owns a personal computer (PC) and modem, he or she would be more likely to complete the tutorial if they also knew how to connect to the Internet from home. This is valuable information for future use as well. When a student begins the thesis research process, the ability to perform that research, day or night, without leaving home, is a substantial advantage.

Pre-tutorial survey data indicate that most students have the hardware to connect from home. Figure 1 summarizes the answers to the question, "Do you own a personal computer?" Figure 2 shows the results from the question, "If so, does your PC have a modem and telecommunications software installed?"
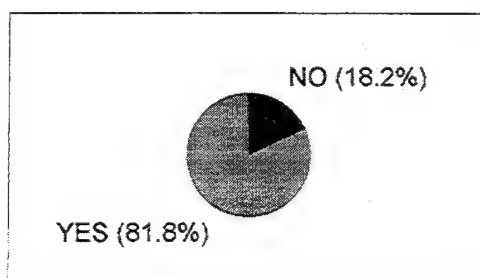
Figure 1. PC ownership.
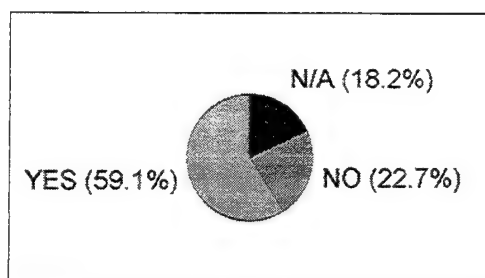
Figure 2. Modem/telecommunications software installed.

Clearly, 59 percent of the sample population have the hardware and software to allow log in from home. Appendix B advises a reader that software (Kermit and SIMPC) is available from the computer center. It also advises a reader how to obtain software, at no cost, that will allow a home computer to become a node on the Internet via a Serial Line Internet Protocol (SLIP) connection at the computer center.

On the post-tutorial survey, the question, "Did you use Appendix B. Log in From Home?" was posed. Figure 3 shows the results. This is surprising given the fact that the same proportion, 59 percent, had the hardware and software to do so. A lack of knowledge may be the likely reason. Additionally, most students followed the advice given in the Introduction and completed the tutorial at the computer center.
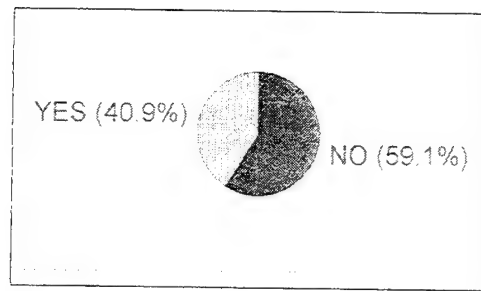
Figure 3. Log in from home.

3. User Friendly

Every effort was made to make the tutorial user friendly and informative while avoiding the intricate aspects of the Internet. Besides, one of the pleasant aspects of the Internet is that you do not need to know how it works in order to use it. This tutorial was written on the assumption that instructions cannot be too basic. This proved to be a worth while assumption. For example, several steps called for a user to enter their *username*. More than one subject typed in "*username*," even though a detailed explanation of *username* had been given. The draft tutorial was modified to include an example of *username* on every occasion that it was required. Detailed, step-by-step, key-stroke by key-stroke instructions were given for every exercise. Numerous comments were made relative to how easy the tutorial was to follow. To our knowledge, no one became lost in cyberspace.

Sitting in front of a monitor punching keys can become monotonous no matter how interesting the subject may be. For this reason, humor was injected as much as practical to keep the dialog lively.

Exercises were employed as the primary learning device. Each exercise was selected for its simplicity, likelihood of establishing a quick connection and providing a user with something of value or interest. For example, the Telnet exercise connected a user with the University of Michigan Weather Underground. This service provides the latest weather conditions nation-wide, earthquake and hurricane alerts/reports and most importantly, ski conditions. Based on feedback, this was a popular exercise. The Netscape exercise involved a quick cyberspace trip to Hawaii.

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With the rapid growth of the Internet, users are experiencing an overall slowing down of the net. This can lead to some degree of frustration. It is almost impossible to establish a Telnet connection during normal business hours. Archie searches can take as long as seven hours and your queue position will often be around 500. For this reason Appendix A of the tutorial, Alternate Addresses for Exercises, was included. If during an exercise, a user cannot make a connection or excessive delays are encountered, he or she simply turns to Appendix A and tries another address.

The overall length of the tutorial was of major concern. A lengthy tutorial composed of hundreds of pages would most likely end up collecting dust in the thesis barn. Long books about the Internet are already available.

The post-tutorial survey asked the question, "Was the tutorial too lengthy?" Figure 4 shows the response. Only three subjects said yes which indicates the length is optimal.
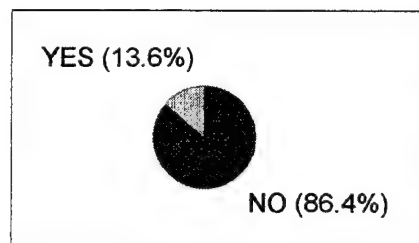
Figure 4. Tutorial too lengthy?

Another question, in a different format, asked, "To what extent was the tutorial user friendly?" A scale from 1 to 5, with 1 being no extent and five being the maximum extent, was used. The average score from all 22 respondents was 3.6, slightly lower than anticipated.

4. Beneficial to Students

There is little value to any tutorial if it does not succeed in teaching a user the intended material. Efficiency of time spent using the tutorial is also a design issue.

The question to be answered is this: What is the best way to convey this information? We believe the answer is experience. A tutorial user will learn by doing. Each tool is demonstrated step-by-step on the Internet using realistic exercises. The exercises were carefully designed as mentioned before. Another objective of the exercises was to provide a user with additional information about the Internet for further study. The Archie exercise, for example, took the user on a search for the electronic book, *Big Dummy's Guide to the Internet*. Appendix A of the tutorial, Alternate Internet Addresses for Exercises, contains an ample supply of addresses and Uniform Resource Locators (URL's), which a student can use for further study.

The question, "To what extent did you benefit from the tutorial?" was on the post-tutorial survey. On the 1 to 5 scale, the overall average was 3.8, meaning the tutorial was perceived by the sample as highly beneficial.

B. EXISTING INTERNET EXPERIENCE LEVEL OF THE SAMPLE

In order to gauge the effectiveness of the tutorial it was necessary to determine how much experience the sample had with the Internet. If the sample were experienced Internauts, a basic tutorial would be of little benefit. If the sample had little or no experience with the Internet, the statistics measuring the change in ability levels would be more meaningful and the true goodness of the tutorial would be established. Six questions were asked on the pre-tutorial survey to help establish an overall experience level. Those questions and the responses to them were:

Have you ever used the Internet for electronic mail?
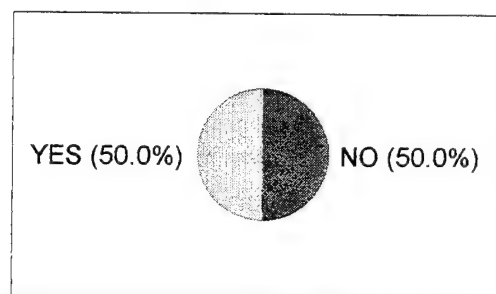
Figure 5. Use Internet for email.

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Do you access any of your NPS accounts from home via modem?
(N/A represents the students who do not have a PC and /or a modem and
telecommunications software)
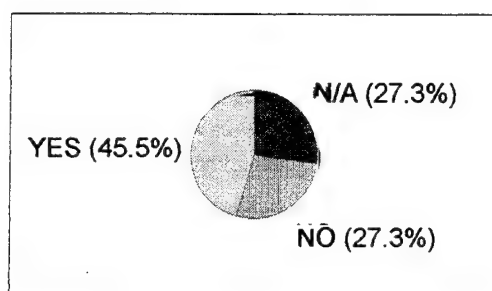
Figure 6. Access accounts via modem.

Have you ever used the Internet for information search and retrieval?
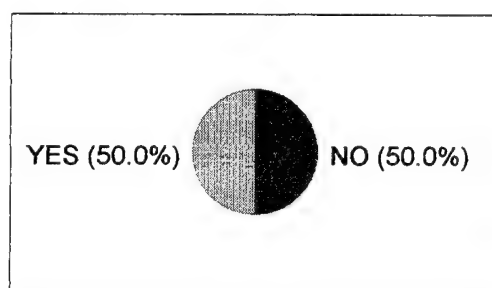
Figure 7. Use Internet for information
search and retrieval.

Do you have any Internet experience?
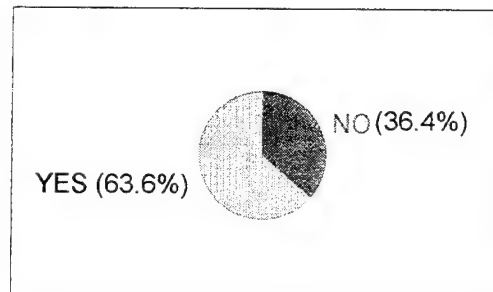
Figure 8. Internet experience.

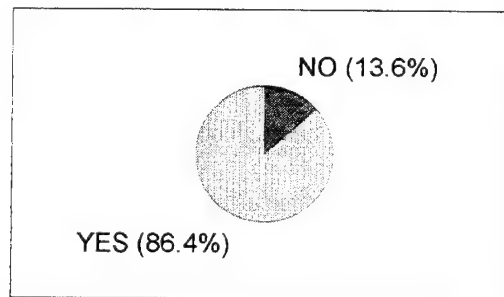Prior to this survey, did you intend to use the Internet for email?

Figure 9. Intend to use Internet for email.

Prior to this survey did you intend to use the Internet as a thesis research tool?
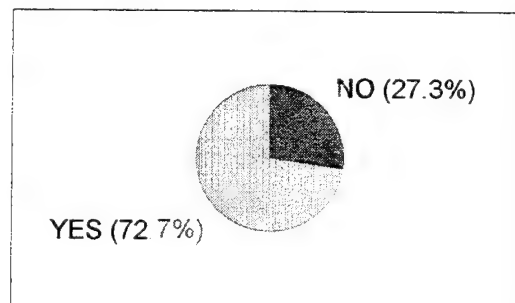
Figure 10. Intend to use Internet for
thesis research.

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Overall, this sample has a high level of Internet experience. Fifty percent have used the Internet for both email and information search and retrieval while 64 percent have some Internet experience. This level of experience was unexpected but serves as an indication of how popular the Internet is becoming.

It appears that this group needs little convincing of the benefits the Internet has to offer. Prior to the tutorial, 73 percent were already planning to use the Internet for thesis research while 86 percent planned on taking advantage of the email service. After completing the tutorial those percentages climbed to 91 percent and 100 percent respectively.

C. STATISTICAL EVALUATION OF ABILITY LEVEL CHANGES

The primary indication of the tutorial's effectiveness was the increase in each subject's ability to perform various tasks on the Internet. On the pre-tutorial survey, the subjects were asked to perform ten tasks on the Internet. After each task they were asked to indicate on a scale from 1 to 5, with 1 representing no ability and 5 representing maximum ability, their assessment of their own ability to perform the task. After completing the tutorial the subjects were given a post-tutorial survey which contained the same ten questions. Both surveys can be found in Appendix B. Appendix D contains a summary of the pre and post-tutorial survey responses from all ten questions.

From an individual perspective, every subject experienced an increase in their average overall ability to perform the stated tasks. From a task perspective, all ten tasks were performed at a higher level of ability by the group as a whole.

An analysis of group performance is revealing. The overall average level of ability for all ten tasks was 2.2 on a scale of 1 to 5, prior to the tutorial. After the tutorial, the average climbed to 3.5, a 59 percent increase. The standard deviation prior to the tutorial was 1.6. Afterwards, it decreased to 1.3, while the variance fell from 2.5 to 1.7. The measure of central tendency, the average, increased while the measures of dispersion, standard deviation and variance, both decreased. These are changes which have the affect of forming a more normal distribution - the desired result.

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Figure 11 graphically illustrates the increase in average ability levels for the entire sample for each of the ten tasks.
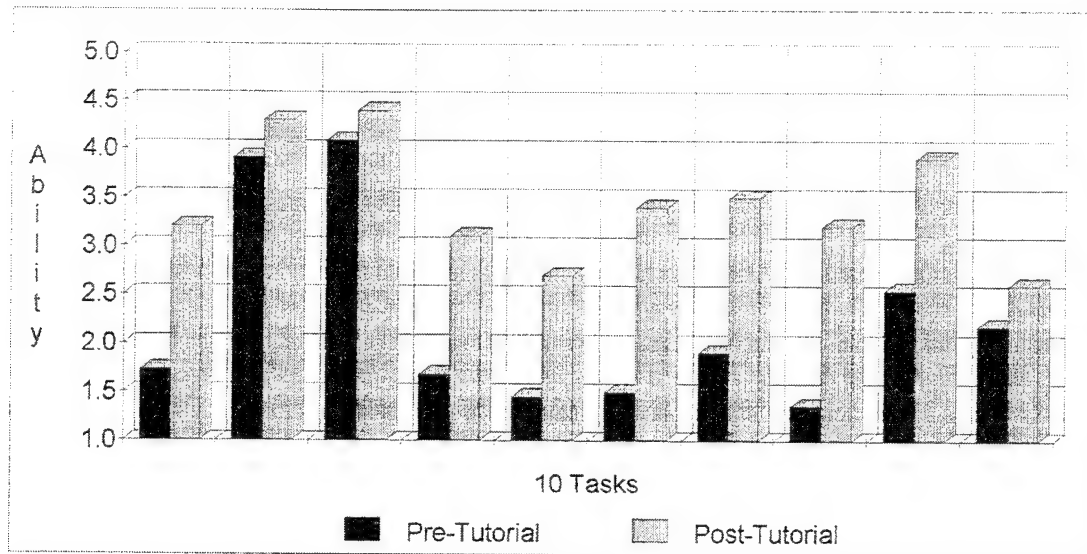

Figure 11. Increase in average ability levels for all ten tasks.

These data closely correlate with the data displayed in subparagraph B, Existing Internet Experience Levels of the Sample. The second and third tasks involved sending and receiving email. Since 50 percent of the sample had previous experience in this area, a relatively small increase was realized. The largest single increase was achieved on task number 6 which involved the use of Telnet. Task number ten also resulted in a modest increase. The task was, "Access your NPS account from home via modem and surf the Internet from your living room." Given that 59 percent of the sample did not attempt log in from home, this slight increase in ability is no surprise.

To further test these outcomes, a t-test was performed on the two sample means. The alternative hypotheses are:

$H_0: u_{pre} - u_{post} = 0$

$H_1: u_{pre} - u_{post} \neq 0$

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The following values were computed using a two-sided test:

Estimated standard error = .44

Observed t value = 3.18

Critical t value at the 2% significance level for 40 degrees of freedom = 2.423

Since the observed t value 3.18, exceeds the critical t value, 2.423, the null hypothesis was rejected. We can conclude that the two means have more than a chance difference and this difference cannot be attributed to errors of sampling. Therefore, the different means are a result of the tutorial's effectiveness.

D. FEEDBACK

1. Written Feedback

Feedback was requested on several occasions and three avenues were provided to make it as easy as possible. The post-tutorial survey had space for comments the students wanted to make and most took advantage of it. When the tutorial was initially distributed, the subjects were asked to annotate their copy as they worked with it. All copies of the draft tutorial were collected with the post-tutorial survey. Finally, the author sent an email message to each subject soliciting feedback via reply email. Six replies were received, all containing useful suggestions.

All 22 subjects provided written feedback which played a role in revising the draft tutorial. Asking the subjects to annotate the tutorial as they proceeded through it proved beneficial. In total, 84 changes were made to the draft tutorial as a direct result of written feedback.

2. Verbal Feedback

Verbal feedback was mostly favorable. A few subjects were disappointed that instructions for the Macintosh were not included. The consensus was that the tutorial was helpful and should be distributed to every student when they check in to NPS.

Computer center personnel reviewed the tutorial and provided assurance that it was technically correct. They were pleased that such a document had been written since one does not exist for the computer center. They also expressed a strong desire to place the tutorial on the WWW for evaluation and immediate access.

E. SUMMARY

The tutorial developed here is tailored to a NPS student who does not have sufficient time to read additional books or learn new software. In roughly one fourth of the time it would take a novice Internet user to read a book about the Internet, the user will become proficient with the most valuable tools offered by the Internet.

Both objectives were achieved and the effectiveness of the tutorial was better than anticipated. A deficiency was identified and an effective solution has been provided at little cost. The increase in ability levels will motivate the students to explore this incredible network.

IV. ANALYSIS

A. NUISANCE VARIABLES

1. Variety of Hardware and Software

With the wide range of computer hardware and software, it is practically impossible to address every configuration. This is one reason this tutorial was based on the resources at the NPS computer center. Several subjects experienced difficulty with Appendix B, Log in from Home, because they were Macintosh users or did not have Microsoft Windows installed on their PC. Future tutorials may include an additional Appendix to assist Macintosh users.

2. Subject Experience Levels

Experience levels at both ends of the spectrum were encountered. A small number of subjects had experience with computers and frequently used the Internet. For these individuals, the tutorial was a basic review at best. At the other end of the spectrum was the student who could be considered computer illiterate. Although these individuals may conceivably benefit the most from a tutorial, they will certainly have difficulty getting started. A tutorial that begins with the very basics of computer usage would be excruciatingly long and boring. Yet one person taking this tutorial did not understand what a directory was or why it was necessary to create one. This would lead one to assume some knowledge of computer fundamentals, but this is a dangerous assumption.

3. Rapid Change on the Internet

In the time that this study was completed many changes were witnessed. For example, most of the Internet addresses in textbooks are no longer valid. Those that worked one week were useless the next. Within six months the addresses contained in this tutorial may change and this will lead to great frustration for the Internet novice. New services will undoubtedly change the way the Internet is navigated, as did Mosaic. Netscape is relatively new and the second version has already been released.

B. IMPACT OF THE TUTORIAL

The tutorial clearly had a substantial impact on the sample even though 63 percent had prior Internet experience. User ability not only increased, but it increased dramatically for the sample as a whole and for each subject individually. Mastering the tools offered by the Internet increased the students' productivity by large measure.

C. RECOMMENDATIONS

This tutorial can serve as a starting point from which future tutorials can expand. Few things remain static and this is particularly true for the Internet. New technologies are evolving which affect the hardware, software and even the way we learn. Refinement and maintenance of this tutorial will not be desired, but required.

V. SUMMARY AND CONCLUSION

A. SUMMARY

The "Information Super Highway" is a reality that should not be ignored. It offers the student many tools that will greatly enhance their productivity while here at NPS. Mastery of the Internet will also benefit the officer long after they depart NPS. As the Internet expands, its presence is being felt in many areas of military operations.

Currently, few students take advantage of this powerful tool, in spite of the fact that most have the necessary hardware and software to do so. An Internet tutorial given to every student who requests one at check-in may very well rectify this problem in a very cost effective manner.

B. CONCLUSION

The two objectives of this thesis were to develop an Internet tutorial and evaluate its effectiveness. The resultant tutorial proved to be extremely effective by virtue of the dramatically increased ability levels of the sample. In addition to the statistical analysis, feedback, in both verbal and written form, indicates that the tutorial was extremely helpful.

Without question, the Internet can be a valuable tool when the military officer assumes the role of student at NPS with the mission of earning a Masters Degree.

This tutorial provides a tested basis for the development of an Internet tutorial for use throughout the U.S. Navy and Department of Defense.

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APPENDIX A. INTERNET TUTORIAL

NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA

A FIRST ACCESS
INTERNET TUTORIAL

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TABLE OF CONTENTS

I. INTRODUCTION

This tutorial is designed specifically for the Naval Postgraduate School (NPS) student. The objective is to present the basics of Internet navigation using the resources at NPS and to make the user aware of the capabilities of this network. If you have limited or no experience with computers or the Internet, this tutorial is definitely for you.

You may be asking yourself, "why is the Internet important?" Ask any NPS student who is using the Internet for thesis research and they will tell you that it can save weeks worth of work. It is the library of libraries that puts information at your fingertips. Your life at NPS (and beyond for that matter) will be much easier if you know how to use this tool. Another reason is that the electronic frontier will soon push its way into every home and office in America. Everyone will be online.

Experience has always been the best teacher and this principal is used throughout the tutorial. You will learn by doing. Every tool used to navigate your way through cyberspace is demonstrated step by step, keystroke by keystroke. Do not try to commit each step to memory. This will come with practice, plus, you can always refer to this document.

An aspect of the Internet is that a single task can be accomplished in various ways. Every effort was made to present the easy way. The Internet is growing at an extraordinary rate. As a result, response times are slowing down because of heavy usage. Do not expect immediate response to some of your keyboard inputs. It may take several seconds or even minutes during peak business hours. Late at night is the best time to experiment with Internet. If you fail to make a connection while doing the exercises, try one of the alternate addresses in Appendix A.

Most students will surf the net while using one of the many Sun workstations located around campus. This tutorial is meant to be completed at one of those locations, preferably at the computer center where consultants are available to help you. If you have a PC at home running Windows and a modem, you may prefer to complete the tutorial from the comfort of home. See Appendix B for details. So get comfortable and enjoy your test-drive on the Information Super Highway!

II. WHAT IS THE INTERNET?

An attractive facet of the Internet is that you do not need to know the technical details of how it works in order to use it. Therefore, techspeak will be used sparingly. The Internet is a global network of networks. This means that the host computer with your account, is interconnected (not directly connected) to every other computer on the Internet. The Internet is a packet-switched network, where all computers communicate with each other by speaking the same language. This language is called Transmission Control Protocol / Internet Protocol or TCP/IP for short. Each host computer, like ours here at NPS, has a router which acts like a traffic cop directing each packet to its destination using the most expeditious route possible.

The Internet facilitates two functions - communicating with other people and finding information. It performs these functions using three basic services:

1. **Electronic mail** or email;

2. **File transfer** which allows you to transmit or receive files from distant computers;

3. **Remote log in** which allows you to log in to a computer located across the country or around the world and control it as if it were right in front of you.

Everything you do on the Internet relates to one of these three services or a combination of them. The latest graphical interfaces such as Mosaic and Netscape use these three services without you being able to see them.

III. UNIX

Virtually every host computer on the Internet uses the Unix operating system. The NPS computer is no exception. No matter how much you dread learning new software, Unix cannot be avoided. It is actually very simple, especially if you are familiar with MS DOS. Here are the highlights:

1. Unix is case sensitive, e.g., **MAIL** in all caps differs from **mail** lower case.

2. Unix uses a hierarchy of directories and subdirectories, separated by **slashes** instead of backslashes.

3. Directory and file names can be 32 characters long.

4. Commands are always entered the same way. You type the command, press spacebar, then type whatever object you want the command to take action on. This is called the **action** space *object* format.

Appendix C contains a list of Unix commands. Appendix D is a list of all commands needed for the Internet tools. You may want to pull these pages out and have them handy as you go along.

A. YOUR UNIX ACCOUNT

If you do not have a Unix account, go to the Computer Center in Ingersoll Hall, room 141. The account registrar will establish your Unix account, let you choose a password and provide your email address. At NPS, email addresses are the initials of your first and middle name followed by the first six letters of your last name, followed by @nps.navy.mil. For example, LT Ivan B. Good will have, ibgood@nps.navy.mil as his email address. The "ibgood" portion is the *username*. More on addresses later.

B. LOGGING IN

Sun workstations are in Halligan 201C, Ingersoll 141, Root 222 and Spanagel 311. We recommend that you go to Ingersoll 141 since consultants are there. Remember this:

☠ NEVER TURN OFF A SUN WORKSTATION ☠

When you first sit at the Sun workstation the screen may be blank. If so, press [ENTER] and the screen will light up with the log in prompt displayed. The prompt will look something like this:

in50202 login: (the number will be different)

Before we start the first exercise, we will use the following format throughout the tutorial to enter commands. Type means get ready to punch keys. Commands will be in **bold**. Type them exactly as they appear (remember, case sensitive). The object is variable information that you must provide and will appear in *italics*. There is always a space between the command and the object. After you type the object, press the [ENTER] key, no space is required. Text after [ENTER] is explanatory. Read through the entire step before you attempt it. Complete all steps in order because subsequent steps build upon the previous ones. In addition to the [ENTER] key, the following icons will be used:

🖱 = click (press and release) the left mouse button.
🖱 = click the right mouse button.
🖱 = double click the left mouse button.

All exercises will begin at the Unix prompt (except for the Login exercise).

Exercise: Login

After completing this first exercise, if you are unable to log in, it is probably because you typed in upper case. Recycle the CAPS LOCK key and reenter. If the keyboard seems to be stuck in upper case, type [CTRL] [C] simultaneously, [CTRL] [D] simultaneously [ENTER]. Another possibility is that your password was "cracked" by the password checker which is run every night. You cannot log in when this happens. See the account registrar for a new password.

1. Type *username* [ENTER]. *username* is your user name. Be sure CAPS LOCK is off. The Password prompt will then appear. It looks like this:

   Password:

2. Type *pwpwpwpw* [ENTER]. *pwpwpwpw* is your password. Remember case sensitivity. As you type, the letters will not appear on the screen for security reasons. Next you will see the security warning, ending with this message at the bottom of your screen:

   Starting OpenWindows in 5 seconds (type Control - C to interrupt)

3. For this tutorial, type [CTRL] [C] simultaneously.

If you didn't type [CTRL] [C] fast enough and find yourself in OpenWindows, you need to exit. Place the pointer anywhere in the blue background, 🖱. Place the pointer on Exit and 🖱. Place the pointer on Exit, 🖱 to confirm. Type [CTRL] [C] to prevent automatic logout.

You are now logged in. Your Unix prompt will look something like this:

   <102in50215(SunOS) /kepler_u1*username*>

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username will be your *username* and is also the name of your home directory, the one you are in right now. This is where you will keep files and make further subdirectories. It is your starting place. The uppermost directory is the root directory, symbolized by the "/" (slash). The root directory is not the same as your home directory. As you descend down from the root directory, through subdirectories, you form a path to your home directory.

If you need to stop the tutorial before you are finished, you should log out of your Unix account. In fact, if you are ever away from the workstation for more than five minutes, log out for security reasons. To log out, type **logout** [ENTER] at the Unix prompt.

C. CREATE AND NAVIGATE THROUGH DIRECTORIES

Exercise: Create subdirectories using Unix commands
(Appendix C is a list of Unix commands)

In this exercise you will start from your home directory and create subdirectories. Next, you will switch from one subdirectory to the other.

1. Type **mkdir** *sample.directory* [ENTER]. Unix allows you to use 32 characters for file and directory names (use any character except spaces, $, &, ", and *). You will not see this directory until you change to it. **mkdir** for **make directory**, is similar to the DOS md command.
2. Type **cd** *sample.directory* [ENTER]. You **changed directory** to *sample.directory* by moving from your home directory down one level to *sample.directory*.
3. Type **pwd** [ENTER]. **P**rint **w**orking **d**irectory. Shows the directory you are currently in, plus the entire path from the root directory.
4. Type **cd ..** [ENTER]. Be sure to include the space after **cd**. This moved you up one directory. You should be at your home directory.
5. Type **cd** [ENTER]. This takes you to your home directory from anywhere. You will not see any change on your screen during this step.

IV. ELECTRONIC MAIL

Email is the biggest use of the Internet. In geekspeak, email is called asynchronous communication. That means you no longer need to play telephone tag. You can send email to virtually anyone who has an email address, anywhere around the world, day or night. Even subscribers to Compuserve, AOL, Prodigy and the other commercial information services. These systems are not part of the Internet, however, they have email gateways that allow them to take advantage of the email service. Currently, the best way to get someone's email address is to call them on the telephone and ask for it. For these and all exercises, feel free to use the author's email address, *jwrobins*, to experiment. It is valid until 15 June 1995.

A. INTERNET ADDRESSES

Every user and piece of hardware on the Internet has its own unique address. They come in two forms:

1. Character addresses that people can understand, e.g., ibgood@nps.navy.mil;

2. Numeric addresses that computers understand, e.g., 131.120.50.201 (known as a dotted quad).

The last three letters of the character address will indicate the domain or the kind of organization it is. The six domains are: mil = military; gov = government; net = network; com = commercial; edu = educational; and org = miscellaneous organizations. If the address ends with two letters, this means the address is located in another country. If you are sending email to someone on your local network (here at NPS), all you need to use is their *username*, otherwise, use the full address. Be advised, Internet addresses change frequently.

B. SENDING, RECEIVING AND REPLYING TO EMAIL

Four email tools are available at NPS for all of these. We will use the Unix UCB Mail program because it can be found on every Internet host computer.

The other tools may not be at your disposal when you transfer from NPS, but Unix will always be there.

A word about Internet security and acceptable use. There is no security. Do not send anything you wouldn't want your commanding officer to see. Use the Internet for unclassified, official business only and avoid obscenities, profanity, commercial use and interfering with others in any way. Do not type all capital letters as this denotes shouting to the reader.

Exercise: Sending email.

We'll practice by sending email to ourselves. In the future, replace *username* with the *username* of the person you are sending email to.

1. Type **mail** *username* [ENTER]. *Username* is your *username*, e.g., **mail** *ibgood*. The Subject prompt will appear next, asking you for the subject of your message. This is an optional entry, but you should always include a subject line.

2. Type *email test* [ENTER]. Subject can be any descriptive phrase or word.

3. Type at least a two line message. There is no word wrap, so press the [ENTER] key when the cursor is about one inch from the edge of the screen. You cannot go back to a previous line but you can backspace to correct errors on the same line.

4. When your message is done, press [ENTER] to put the cursor at the beginning of the next line (the first blank line after your text).

5. Type **.** [ENTER]. This is a period which tells the email program that your message is done, send it, then exit the email program. Your email is on its way. If you made a typo in the address, or the destination account no longer exists, your email message will be bounced back to your mailbox. This is the only indication that your message did not make it. If you decide not to send a message after you start, [CTRL] [C], will kill your message and return you to the prompt ([CTRL] [C] will stop any process).

6. Type **mail** [ENTER]. To restart the mail program. Your message is probably waiting for you already. If so, ignore it for now.

7. Type **?** [ENTER]. This will give you a list of all Mail commands.

8. Type **q** ⏎. Quits Mail program.

You can also send a text file using UCB Mail. Make sure you are in the directory containing the file and type **mail** *address* *<filename* ⏎. *address* is the destination address. Another useful trick is to use an alias instead of email addressees. An alias is a name you can use in place of an email address. This is handy for addresses you frequently use. For example, instead of typing *ibgood@pentagon.navy.mil*, you could just type *ivan,* or any other name that you have chosen to be the alias. See a consultant if interested.

Exercise: Receiving/reading email.

If you have email, Unix will display, "You Have Mail," upon Login.

1. Type **mail** ⏎. You will see a display similar to Figure 1 below. Your message should be there.

```
<102 in50217(SunOS) /kepler_u1/jwrobins> mail
Mail version SMI 4.1-OWV3 Mon Sep 23 07:17:24 PDT 1991   Type ? for help.
"/usr/spool/mail/jwrobins": 1 message 1 new
>N  1 jwrobins            Sun Apr 16 20:58   12/378   email test
```

Figure 1. Email message listing.

Each message line includes: N or U (New or Unread); message number; address of sender; date/time message was sent; message size (lines/characters); and subject line. The ampersand (&) is the UCB Mail prompt.

2. Type 1 ⏎. Or the number of the message you want to read.

3. Type the number of other messages, if you have additional email. If your message is too long for one screen, type **more** ⏎, to see the rest.

4. Type **h** ⏎. The **h** command displays a list of all your messages.

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Exercise: Replying to email

   In this exercise you will reply to the message you sent to yourself earlier.

1. Type **r** 1 ⌨ENTER. Or the number for the message you want to reply to. Upper case R will send your reply to everyone who received the same message. UCB Mail automatically extracts the senders address and subject line for you. "Re" means reply.
2. Just like before, type in your reply.
3. Type **.** ⌨ENTER, (a period) on the first blank line after your text. Your reply is there by now.

C. MANAGING YOUR EMAIL BOX

   All incoming email is stored in the host computer, not in your Unix account. Make a habit of either saving or deleting your messages immediately after reading them.

Exercise: Managing your email box

1. Type **h** ⌨ENTER. Displays a list of all your messages.
2. Type **d** 1 ⌨ENTER. Message 1 is deleted.
3. Type **h** ⌨ENTER. Message 1 is no longer there.
4. Type **u** 1 ⌨ENTER. Message 1 is undeleted even though you will see no indication of this on your screen. Once you exit the mail program, the message is gone for good. Undelete will not bring it back.
5. Type **h** ⌨ENTER. Displays a list of all your messages with number 1 reappearing.
6. Type **s** 1 *test.msg* ⌨ENTER. Means: save message 1, as filename *test.msg*. Message is saved as a text file. If you select a filename that already exists in your directory, the message will be appended to that file.
7. Type **q** ⌨ENTER. Quits UCB mail and moves all mail that was read but not deleted or saved to filename *mbox* (a file automatically set up with your account) in your home directory. You are now back to your Unix account, home directory. The other way to exit is to type **x** ⌨ENTER.

This exits the program and leaves things as they were before you started the mail program. Nothing is saved, deleted or moved.

At this point, you are out of the UCB Mail program and back in your Unix home directory. The following commands are Unix commands that you will use to manipulate your files.

8. Type **ls -l** ⏎. list long command. The files and directories in the current directory will be displayed similar to those in Figure 2. You should see your new file *test.msg*.

```
drwxr-xr-x  2 jwrobins       512 Apr 16 19:22 email
-rw-r--r--  1 jwrobins       115 Mar 15 22:57 inet.services.txt
-rw-r--r--  1 jwrobins     55802 Apr  3 23:37 inet_resources
-rw-r--r--  1 jwrobins     55802 Apr  3 23:31 inetxt
-rw-r--r--  1 jwrobins    402598 Apr 12 20:00 listserv.Z
-rw-r--r--  1 jwrobins     41693 Apr 16 21:03 mail.rs
-rw-------  1 jwrobins    610341 Apr 16 20:18 mbox
-rw-r--r--  1 jwrobins       388 Apr 16 21:07 test.msg
```

Figure 2. List long display.

A "d", in the first column of each row means that row is for a directory. A "-" in the first column means that row pertains to a file. The **ls -l** command is equivalent to the DIR command in DOS. You should see the file *test.msg* that you saved earlier.

9. Type **mv** *test.msg sample.directory* ⏎. **M**oves file *test.msg* down to directory *sample.directory*.

10. Type **cd** *sample.directory* ⏎. You moved from your home directory down one level to sample.directory.

11. Type **ls -l** ⏎. There is your file *test.msg*.

12. Type **more** *test.msg* ⏎. **more** allows you to read a text file.

13. Type **lp** *test.msg* ⏎. Prints file *test.msg* on the local laser printer. Pick up your printer output from the printer tray.

14. Type **rm** *test.msg* ⏎. rm is the **remove** command. *test.msg* is deleted.

15. Type **cd** ⏎. This will return you to your home directory from anywhere.

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16. Type **rmdir** *sample.directory* [ENTER]. *sample.directory* directory is deleted. Same as
the DOS command rd. Directories must be empty before they are deleted.

17. Type **ls -l** [ENTER]. sample.directory is gone.

18. Type **ls -a** [ENTER]. List all command. Shows all of your files, directories plus the
hidden system files. Do not change the system files. Your display should look
similar to Figure 3.

```
.alias                    .xnews.in50211:0
.ccmsgsrc                 .xnews.in50217:0
.cshrc                    .xsession.18099
.desksetdefaults          INDEX100.GUT
.elm                      Index-byname.gz
.gopherrc                 NewDocument        .
```

Figure 3. List all display with hidden dot files.

19. Type **man** *cd* [ENTER]. The **man** command brings up the Unix **man**ual pages for the
object given. This is the Unix Help feature.

D. ADDITIONAL EMAIL TOOLS

At NPS there are four additional ways to send/receive/reply to email. In Unix
there is a text editor call vi (vee-eye), the most user-underlinefriendly text editor ever created.
Elm is another text editor, however, it interfaces with vi. OpenWindows on your
workstation has a Mailtool that works great, but you must understand OpenWindows
first. WordPerfect 6.0 is available on your workstation and has a very easy to use email
feature. We will discuss how to start WordPerfect in Chapter VIII. At a later date, test
vi and elm, by typing **vi** or **elm** at the Unix prompt.

E. MAILING LISTS

A mailing list is a list of email addresses for individuals all interested in one
particular subject. Thousands of mailing lists exist for every possible subject. Anyone
on the mailing list can send an email message to everyone else on the list, expressing
their views on the subject. A mailing list can be administered by a system administrator,
a person, or automatically by a computer called a Listserv.

To subscribe, you send the administrator your full email address and from then on, you will receive all messages posted to the system. You can also post messages yourself. Stand by for lots of email and only subscribe to one list at a time to prevent email overload.

Exercise: Finding a catalog of Mailing Lists

First, you will send an email message to a Listserv (a computer) requesting a catalog of mailing lists to peruse in the future. The reply will be an email message and may take several hours. The catalog is huge, do not try to print it.

1. Type **mail** *listserv@bitnic.cren.net* [ENTER].
2. Leave the subject line blank, press [ENTER].
3. Type **list global** [ENTER]. This is the message.
4. . [ENTER] Do not forget the period.

---

listserv@bitnic.cren.net is a computer. Your message, **list global**, is actually a command telling the computer *listserv* to send you the catalog of mailing lists. At a later date review the catalog by using the **more** command. It contains every conceivable subject. Choose the mailing list you want to sign up for and follow the instructions contained in the catalog. Instructions for signing off are also in the catalog.

V. TRANSFERRING FILES

Transferring <u>copies</u> of files will be one of your major activities on the Internet. Files can be text, graphics, sound, or programs. File Transfer Protocol (FTP) is the tool used and it is very simple. Find the address of the computer into which you want to tap, start the program by typing **ftp**, log in using *anonymous* as the account name and your *email address* as the password. A tool called *Archie* will accomplish the first step of finding a computer address. Archie will be discussed later. The FTP prompt is: ftp>. All FTP sites have a "pub" directory containing files for retrieving. If you do not know a path, start with /pub.

Exercise: FTP **help**

1. Type **ftp** ⌨[ENTER].
2. Type **help** ⌨[ENTER]. You can also type ?.
3. Type **help** *open* ⌨[ENTER] (or any ftp command).

Exercise: Retrieving a file

This exercise will connect you to a computer at the University of Illinois, Urbana Champaign. You will retrieve a file that contains a list of electronic books.

1. Type **open** *mrcnext.cso.uiuc.edu* ⌨[ENTER].
2. Type *anonymous* ⌨[ENTER].
3. Type your full email address ⌨[ENTER]. e.g., *ibgood@nps.navy.mil*
4. Type **pwd** ⌨[ENTER]. Print working directory. You are at the root directory.
5. Type **cd** *pub/etext* ⌨[ENTER]. Changes directory to etext.
6. Type **dir** ⌨[ENTER]. To see the contents of the pwd.
7. Type **bin** ⌨[ENTER]. Sets the file type to binary. Ascii, the same as a text file, is the only other option.
8. Type **get** *INDEX100.GUT* ⌨[ENTER].
9. Type **bye** ⌨[ENTER]. Terminates the ftp connection and exits ftp program.

10. Type **more** *INDEX100.GUT* [ENTER] to read the file *INDEX100.GUT*, a list of electronic books that you can retrieve using the same procedure. A retrieved file will be placed in the Unix directory you were in when you turned on ftp.

At some point, you will no doubt want to retrieve a file from the Internet that you want to use on your PC at home. Since the Sun workstation and the Internet both use the Unix operating system and your PC does not, you have a minor problem. Fortunately, a set of commands exist to solve this problem and they can be found in Appendix E.

A. FILE TYPES

FTP recognizes only two types of files:

1. Ascii (**A**merican **S**tandard **C**ode for **I**nformation **I**nterchange) is the same as a text file or DOS text. Any text editor or word processor, like WordPerfect, MS Word, etc., can be used to view or edit these files.

2. Binary files are everything else. Programs, sound, animation, video and graphics to name a few.

If you do not know what type of file you want to retrieve, use binary by typing **bin** [ENTER]. This will work for both file types, ascii or binary. Many times the files you retrieve with ftp will be compressed (*filename.Z*) or tarred. Compressed means just that. The file has been crammed into a smaller space in memory. Tar (**tape ar**chive) files are directory names, file names and their contents, all bundled into one file. Computer programs are usually archived as tar files and the word tar will be found somewhere in the filename. You will need to uncompress and untar (extract) these files before you can use them. The commands are: **compress** *filename,* to compress a file and **uncompress** *filename* to uncompress a file. Try the **compress** command on your Unix files to save room in storage. To bundle a directory with subdirectories and files, type **tar -cvf** *myfiles.tar* (or any other file name you like). This will tar the current directory plus contents into a tar file called *myfiles.tar*. To separate (extract) the tar file, type **tar -xvf** *myfiles.tar*. This will restore them to their original tree structure.

VI. REMOTE LOG IN

This service allows the computer in front of you to become a terminal for a remote computer. **Telnet** is the name of the program used to make the connection. Once connected you can take advantage of all public resources located in the remote computer. To use Telnet, find the address of the computer you want to use and type **telnet** *locis.loc.gov,* for example, if you want to get the most up to date legislative and copyright information from the Library of Congress. Telnet is so popular that you may have trouble connecting. Telnet will attempt to connect for a few minutes, but if it doesn't, it will time out, meaning it will turn itself off. Try another Telnet address in Appendix D, or retry the same address later.

Exercise: Remote login

This exercise will connect you to the *Weather Underground* at the University of Michigan.

1. Type **telnet** *downwind.sprl.umich.edu 3000* [ENTER]. The 3000 indicates a specific communications port.
2. Type *sjc* [ENTER]. sjc is the three letter code for San Jose. sfo = San Francisco.
3. Browse around as you like.
4. Type **x** [ENTER] to exit.

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VII. INFORMATION SEARCH AND RETRIEVAL TOOLS

You now have a good understanding of the three basic services used on the Internet. Now it is time to put those services to work and use them to find specific information. This chapter and chapter VIII will cover the tools developed which use the three applications. The tools presented next, Gopher, VERONICA, JUGHEAD and Archie allow you to search for text only. Chapter VIII will cover tools that allow you to retrieve any type of file.

A. GOPHER

Gopher is a very fast, menu-driven navigator for the Internet. When you select an item in the menu it will open another menu. This sequence can repeat up to four or five times. Each item in a menu has a hidden Internet address. Gopher allows you to view the documents before you retrieve them. Gopher servers (a computer) are located around the world, including our own here at NPS, called Peacock. Always begin your search with a local Gopher. All 5500+ Gophers work exactly the same way and they are all interconnected.

Exercise: Using the NPS Gopher

1. Type **gopher** ⏎. You will see the Main Menu like Figure 4 below.

```
         Internet Gopher Information Client 2.0 pl8

                Root gopher server: peacock.nps.navy.mil

-->█ 1.  Introduction to the NPS Gopher/
      2.  Dudley Knox Library/
      3.  Computing Resources/
      4.  Registrar/
      5.  Academic Departments/
      6.  Newsletters/
      7.  Other Gopher Servers/
      8.  Military Information Sources/
      9.  Reinvention/
     10.  ***** SEARCH *****/
     11.  Phonebook.
```

Figure 4. Gopher main menu.

2. A common convention is to list menu selections divided by a slash. Proceed down through the following menu selections pressing [ENTER] after each selection. Arrow down to: Other Gopher Servers (7) [ENTER] / Goddard Space Flight Center (4) [ENTER] / US Government (8) [ENTER] / Whitehouse (15) [ENTER] / Whitehouse Email Announcement (5) [ENTER].

3. Type **m** . To have Gopher email you the document you are looking at.
4. Type your full email address [ENTER]. The file will be emailed to you.
5. Type **u** repeatedly to move back up through the menus.
6. Burrow around "Gopherspace."
7. Type **?** . Displays a list of gopher commands.
8. Type **q** . Quits Gopher. You will see the prompt: Really Quit (y/n) y. Select y.

1. VERONICA

VERONICA (**V**ery **E**asy **R**odent-**O**riented **N**et-wide **I**ndex to **C**omputerized **A**rchives) works with Gopher to find a specific piece of information by searching through Gopher databases for key words or phrases. Once the search is done, VERONICA will present the results in the form of Gopher menus. VERONICA is case insensitive.

Exercise: Finding information about Ada (the DOD programming language)

1. Type **gopher** [ENTER]. Accesses Peacock.
2. Select the following menu choices: Search (10) [ENTER]/ Gopher Sites To Search ---->VERONICA [ENTER]/ Univ. of Manitoba (3) [ENTER].
3. Type *ada* [ENTER]. Wait a few moments for VERONICA to search. You will soon see 25 pages of Ada resources which you can view or download or both.
4. Type **q** [ENTER] to quit, or press **u** to move back up through the Gopher menus.

2. JUGHEAD

JUGHEAD (Jonzy's Universal Gopher Hierarchy Excavation And Display) does exactly the same thing as VERONICA, except JUGHEAD searches no further than the local Gopher server. JUGHEAD is a good tool to start your search with. To access JUGHEAD, select Search (10) from the Gopher Main Menu. Then select Search Peacock . . .

B. ARCHIE

Archie will tell you where a file is archived. Four Archie servers in the U.S. and others around the world with identical databases, keep track of all public archives accessible by FTP. To use Archie (derived from archive) you provide a word, partial word or words that pertain to your subject and Archie will email you a list of archives with filenames and paths. Archie is case insensitive by default but you can make it case sensitive.

Exercise: Finding specific information with Archie

In this exercise you will look for a file containing a copy of the electronic book, *The Big Dummy's Guide To The Internet.*

1. Type **archie** [ENTER]. Displays a list of Archie switches.
2. Type **archie -L** [ENTER]. Displays a list of Archie servers.
3. Type **telnet** *archie.unl.edu* [ENTER]. Next, you will see the Login prompt.
4. Type *archie* [ENTER] at login prompt.
5. Press [ENTER] at password prompt. Your display should look like Figure 5 on the next page.
6. Type **set search sub** [ENTER]. Tells Archie to search for partial words.
7. Type **set mailto** *youraddress* [ENTER]. Provide your email address so Archie can email the search results to you. For example, ibgood@nps.navy.mil
8. Type **set pager** [ENTER] to see a page at a time.
9. Type **prog** *big_dummy* [ENTER]. If you make a typo, press [CTRL] [C], this should take you back to the Archie prompt. We're looking for the book, *Big Dummy's Guide to the Internet.* Archie is case insensitive. Archie will display your queue position and estimated time of search. If it appears that your search will take longer than you want, type [CTRL] [C]. If you wait for the search results, complete steps 10 and 11.
10. Type **mail** [ENTER]. The results will be emailed to you.
11. Type **quit** [ENTER]. To exit the Archie program.

```
                        cmdtool - /bin/csh
<107 in50215(SunOS) /kepler_u1/jwrobins> telnet archie.unl.edu
Trying 129.93.1.14 ...
Connected to crcnis2.unl.edu.
Escape character is '^]'.


SunOS UNIX (crcnis2)

login: archie
Password:

###################################################################################

        #    # ####### ######  ######    #    #####  #   #    #
        ##   # #       #       #   #     #   #     # #   #   # #
        # #  # #       #       #   #    # #  #     # #   #  #   #
        #  # # #  ##### ######  ######  #   # #####  ###   #     #
        #   ### #       #       #   #  ####### #   # # # # #######
        #    ## #       #       #   # #     #  #   # #   # #     #
        #     # ####### ######  #     # #     # #####  #   # #     #

     Welcome to the ARCHIE server at the University of Nebraska - Lincoln

    If you need further instructions, type help at the unl-archie> prompt.

###################################################################################


# Bunyip Information Systems, 1993

# Terminal type set to 'sun-cmd 24 80'.
# 'erase' character is '^?'.
# 'search' (type string) has the value 'sub'.
unl-archie>
```

Figure 5. Archie login page.

C. WORLD WIDE WEB (WWW)

WWW also takes you throughout the Internet, but uses hypertext instead of menus
like Gopher. Hypertext is text that is linked to other documents at other locations and
you move from one to the other by selecting a word or highlighted text. This is point and
click navigation. Not only text but sound and graphics can be linked as well. The Web
uses additional protocols called **Hypertext Transport Protocol** (HTTP) and **Hypertext
Markup Language** (HTML). HTTP is used for file transfer and does it much faster than
FTP. HTML is the language used to format hypertext documents. The most popular way
to navigate the WWW is with Mosaic or Netscape, both discussed shortly.

Another way to navigate the Web is to Telnet to a public WWW client (a computer attached to the Web) and go from there. At NPS a basic Web navigator called Lynx is available. If you want to try this later just type **lynx** [ENTER] and you will be at the NPS home page, the front door to the web. Do not bother with lynx unless you can't use Mosaic or Netscape for some reason. If you are dialed in from home, Mosaic and Netscape will not be available to you unless you have special software available from the NPS Computer Club called Trumpet Winsock.

1. Uniform Resource Locators

Now is a good time to introduce Uniform Resource Locators (URL's) because they are used extensively on the WWW. A resource can be anything of value on the Internet - a file, computer, database, mailing list or an email address. URL's provide a way to standardize the way resources on the Internet are addressed or pinpointed. A URL will tell you everything you need to know to find a piece of information. You will frequently hear your classmates say, "what's the URL for that file?" Mosaic and Netscape will always show the URL associated with the hypertext links. This will become clear when you experiment with those programs. Here is an example of a URL (do not type this):

ftp://nysernet.org/pub/resources/guides/surfing.2.0.3.txt

A URL will always have three parts. Part one is the service used, always followed by a colon and two slashes. Part two is the information needed to find and access the host computer like *hostname*, login information and ports (like port 3000 in the Weather Underground exercise). The third part will give you the path to the resource, plus filename as the last entry. Here are the parts from the above example:

Part 1: **ftp://**
Part 2: **nysernet.org**
Part 3: **/pub/resources/guides/surfing.2.0.3.txt**

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VIII. WWW BROWSERS

The biggest advantage of browsing is that you do not need to know a bunch of Internet addresses, they are built in to the browser. When browsing, you have no particular subject in mind, you are just exploring the Internet. Although, browsers do have the ability to locate specific resources. URL's are very handy for this.

Two programs are available at NPS that will facilitate your browsing. They are *Mosaic* and *Netscape*. *Mosaic* was created first and revolutionized the way the Internet is navigated, as you will see. *Netscape* was created by the same people working in a different organization. Both require a windows environment and both will allow you to use all the tools mentioned earlier. If you are dialed in from home, these two programs will not be available, nor will OpenWindows, unless you have special software.

A. OPENWINDOWS

This is the program that you were asked to avoid when logging in to your Unix account. You must use it now, so here are a few simple steps to get you started. An online tutorial will quickly get you up to speed with OpenWindows when you have time to go through it (it takes about an hour). Look for it in the Workspace window, Figure 6, titled **Desktop Intro...**

```
┌──────────────────────────┐
│  ⌐⌐     Workspace         │
│ ┌──────────────────────┐  │
│ │ Programs          ⌐  │  │
│ └──────────────────────┘  │
│   Utilities          ▷    │
│   Properties...           │
│                           │
│   Help...                 │
│   Desktop Intro...        │
│                           │
│   Exit...                 │
└──────────────────────────┘
```
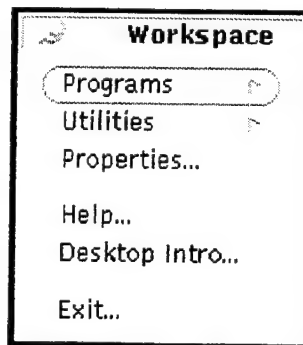
Figure 6. Workspace menu.

Exercise: Starting OpenWindows

When you first log in, OpenWindows will start automatically if you do nothing. We will start from the Unix prompt for consistency sake.

1. Type **openwin** ⌨ENTER. Several windows will appear automatically. Ignore them for now. You will use the mouse to control the windows and pointer. The right mouse button 🖱 (menu button) is for opening menus, the left mouse button 🖱(select button) is for selecting menu items.

2. Put the pointer in the blue background, 🖱. This will open the Workspace Window like Figure 6.

3. Put the pointer on **Programs**, 🖱. This will open the Programs Menu, like Figure 7. By the way, the fourth item in this menu, **Mail Tool**..., is the email feature mentioned earlier.

Workspa	Programs
Programs	Command Tool...
Utilities	Text Editor...
Properties...	File Manager...
	Mail Tool...
Help...	Calendar Manager...
Desktop Intro...	Clock...
	Calculator...
Exit...	Print Tool...
	Audio Tool...
	Tape Tool...
	Binder...
	Snapshot...
	Icon Editor...
	Performance Meter...
	Shell Tool...
	Demos
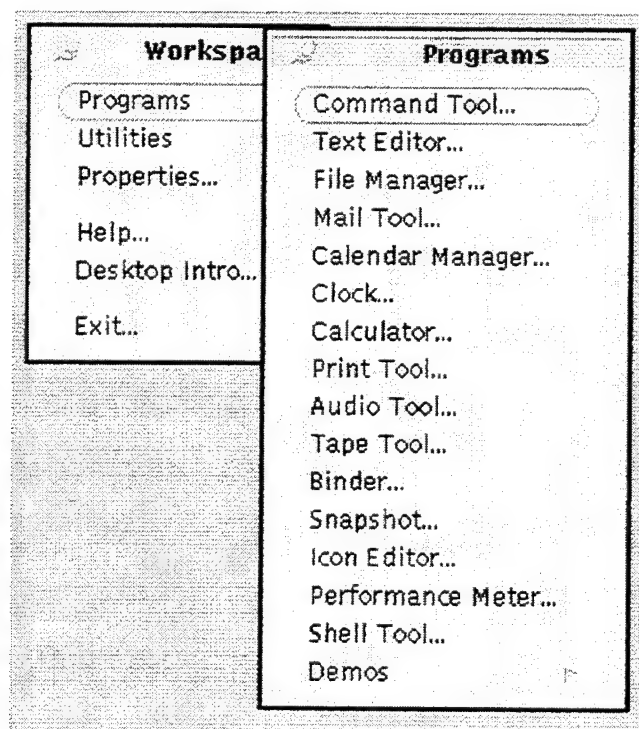
Figure 7. Programs menu.

4. Put the pointer on **Command Tool**, ⌨. This will open the Command Tool window, Figure 8, where you will type in all commands.

5. Put the pointer inside the Command Tool window, ⌨, a delta symbol will appear. Now you are ready to enter commands. If you would like to use WordPerfect at a workstation (not now), just type **wp** in the command tool window and press ⌨ENTER.

```
cmdtool – /bin/csh
<102 in50215(SunOS) /kepler_u1/jwrobins>▲
```
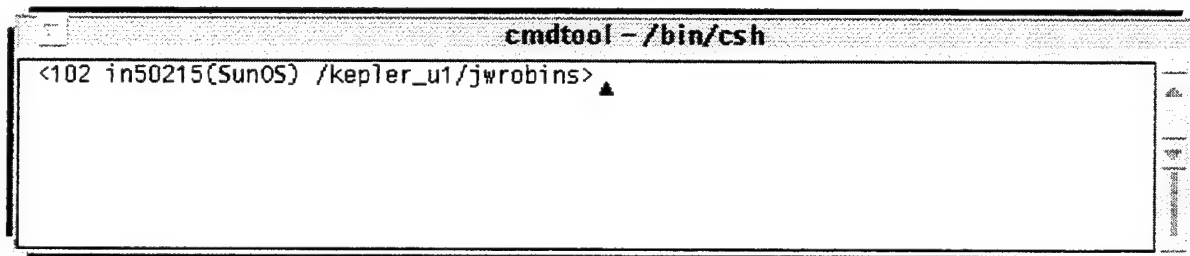
Figure 8. Command tool window.

B. MOSAIC

Mosaic is a powerful multimedia, graphical interface to the WWW. The best way to learn about Mosaic is to use the Help feature in Mosaic itself. You must be in OpenWindows to use Mosaic.

Exercise: Surfing the Web with Mosaic

1. Start from the Command Tool window.
2. Type **xmosaic** ⌨ENTER. It will take several seconds for the NPS home page to appear. When the pointer turns into a clock icon, wait, Mosaic is working.
3. Put the pointer on **Help** (upper right of window), ⌨.
4. Select **Manual** ⌨. Take a quick look around. To scroll through a document, click on the up and down arrows on the right side of the window. Blue colored or underlined text, is linked to other documents across the WWW. Click on this text with the left button to navigate.
5. The **Back** and **Home** buttons are at the bottom of every window. **Home** will always take you to the NPS Home Page. **Back** will take you to the previous window.
6. ⌨ on the **Home** button.

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7. 🖱 on **Help** again. 🖱 **Demo**

8. When you are tired of surfing, 🖱 on **Home**.

9. 🖱on the **Open** button on the bottom button bar.

10. Put the pointer in the **URL To Open** window, 🖱.

11. Type *http://www.pathfinder.com* 🖱 **Open** button. It will take several seconds to
    connect.

12. 🖱 *Bulletin Boards* (lower right corner of dark window).

13. 🖱 the *O.J. Board* or any other option.

14. 🖱 **Home** when you have had enough.

15. To exit Mosaic, 🖱 on **Close Window** (bottom right) or open the File Menu, 🖱 **Exit**
    Program (bottom).

C. NETSCAPE

Netscape is another powerful, multimedia, point and click navigator for the WWW. It is similar to Mosaic but you may find it slightly more user friendly.

Exercise: Go to Hawaii via Netscape

1. Start from the Command Tool window.
2. Type **netscape** ⏎.
3. 🖰 the **Open** button, top button bar.
4. Put the pointer in the **Open Location** window, 🖰.
5. Type http://www.nps.navy.mil 🖰 on **Open**.
6. Wait a few seconds for the NPS Home page to appear.
7. You will probably want to increase the font size unless you enjoy straining your eyes. 🖰 **Options**, just above the button bar on the top of the window.
8. 🖰 **Preferences**.
9. Look for **Font Style**. 🖰 Large or Huge.
10. 🖰 OK.
11. 🖰 on **Help** (upper right).
12. 🖰 **Handbook** for the on-line tutorial.
13. 🖰 the **Open** button.
14. Put the pointer in the window, 🖰.
15. Type www.aloha.net, 🖰 **Open**. Be a tourist in Hawaii for a few minutes.
16. 🖰 **File** menu.
17. 🖰 **Exit**, to exit Netscape.
18. To exit OpenWindows, put the pointer in the blue background, 🖰, 🖰 on **Exit**, 🖰 on **Exit** to confirm.
19. To exit your Unix account type **logout** ⏎.

Congratulations! You have completed the Internet tutorial. You are hereby declared an official,

Cyberspace Internaut. :-)

APPENDIX A. ALTERNATE INTERNET ADDRESSES FOR EXERCISES

1. FTP

ftp.nps.navy.mil	NPS FTP server
oak.oakland.edu	Contains a collection of MSDOS software
rtfm.mit.edu	For a list of Internet services at path: pub/usenet/alt.internet.services. Filename is: Updated_Internet_Services_List
sunsite.unc.edu	Contains Unix PC software
wuarchive.wustl.edu	Contains graphics files
prep.ai.mit.edu	Jargon file in directory /pub/gnu filename: JARGONNN.ASCII.Z
ftp.cs.cornell.edu	Cornell University

2. TELNET

locis.loc.gov	Lib. of Congress card catalog
spacelink.msfc.nasa.gov	use *NEWUSER* as username and password
tycho.usno.navy.mil	Login as *ads*
starmaster.uhcc.hawaii.edu	University of Hawaii library system (type lib, select 5 for VT-100)
freenet.fsu.edu	Florida St. Univ. Login as *Visitor*

3. GOPHER

Type **gopher** *address* ENTER

peacock.nps.navy.mil	NPS gopher server
consultant.micro.umn.edu	University of Minnesota where Gopher was created. At login type *gopher*.
gopher.dtic.dla.mil	Defense Technical Info.Center

gopher.sunset.se ....Swedish gopher. Log in as gopher.

wiretap.spies.com...Commercial gopher

gopher.internic.net ....Log in as gopher

4. WWW

Telnet to these public WWW clients

ukanaix.cc.ukans.edu....................................At log in type *kufacts*. Client is called Lynx.

info.cern.ch ....Located at Cern, developers of WWW, in
Switzerland

wired.com ....Wired Magazine

Interesting URL's

http://www.nps.navy.mil   NPS www server

http://enterprise.osd.mil/ebird/welcome.html   OSD Earlybird

http://wings.buffalo.edu/world Worldwide WWW information

http://www.research.digital.com/SRC/virtual-tourist/California.html   CA Virtual Tourist

http://mistral.enst.fr/~pioch/louvre/paintings/theme/impressionnisme.html   Louvre

http://www.llnl.gov/ptools/ca.gif   Color relief map of CA

http://www.dtic.dla.mil/dtiw   Defense technical Information Center, Internet info

http://www.btg.com/janes Jane's Electronic Information System

http://www.whitehouse.gov   Whitehouse

http://www.yahoo.com

http://www.digimark.net/california   Monterey, CA Home Page

http://www.monterey.com/california

5. ARCHIE SERVERS

archie.unl.edu.....................................129.93.1.14.............................Nebraska

archie.rutgers.edu.............................128.6.18.15.............................New Jersey

archie.ans.net ....147.225.1.10.............................New York

archie.sura.net................................128.167.254.179.............................Maryland

APPENDIX B. LOGIN FROM HOME

If your spouse and children do not recognize you any longer because you are never home, this Appendix may help. It would be impractical to provide instructions for every possible hardware and software configuration, therefore, this Appendix will address the IBM PC running Windows. Macintosh users might consider joining the NPS Macintosh users group which can provide the information in this Appendix for the Macintosh computer.

If you have an IBM compatible PC at home with a 386 processor running MS DOS with Windows and a modem, you can complete most of this tutorial at home. You simply Log in from home and your PC becomes your terminal. Remember, your PC is a terminal. All activity takes place in your UNIX account at NPS. For example, incoming email will reside in the computer at school, not your PC. If you execute the print command, the printer at school will print your document. If you do not use MS Windows, copies of Kermit and SIM/PC are available from the consulting office. Bring one blank, formatted diskette with you.

You will not be able to use OpenWindows, Mosaic or Netscape from home unless you have special software on your PC which can be obtained from the NPS Computer Club. The club also has a program called Trumpet Winsock which allows you to Log in from home via a Serial Line Internet Protocol (SLIP) connection. This type of connection makes your PC a node on the Internet complete with your own Internet address.

Exercise: Log in from home using MS Windows Terminal

Start from the Program Manager Window . All mouse selections are with the left button.

1. Click on the Accessories icon. The Accessories window will look like Figure B1.
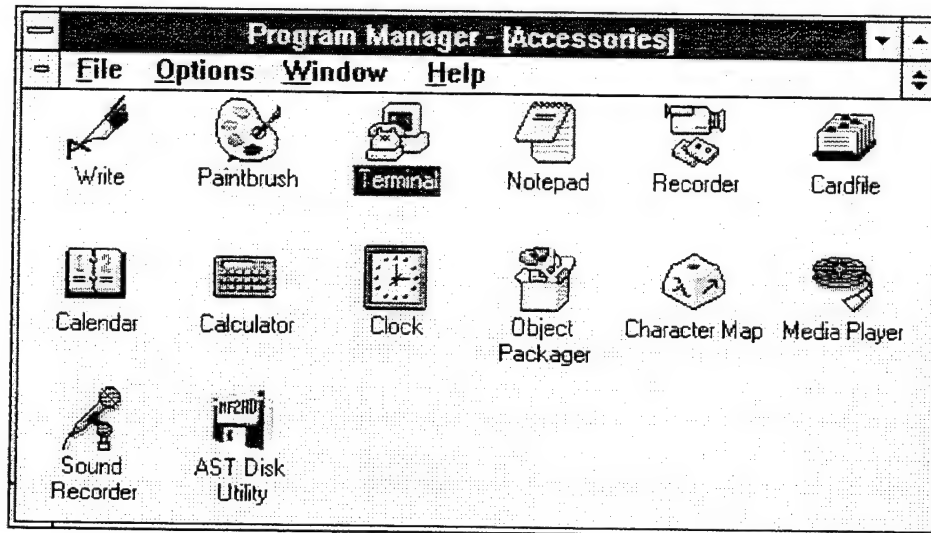
Figure B1. Accessories window.

2. Click on the Terminal icon. The Terminal window, Figure B2, will open.
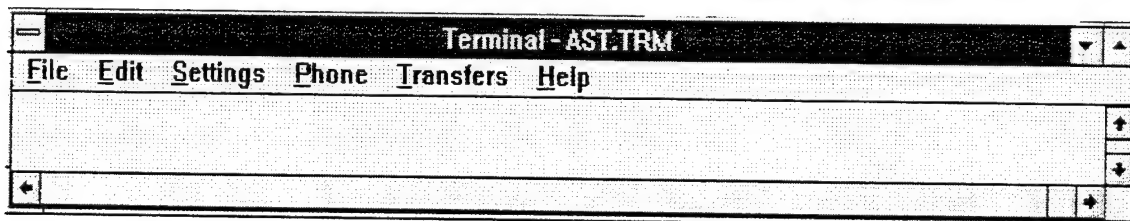
Figure B2. Terminal window.

3. Click on Settings to open the Settings Menu.
4. Click on Communications. The Communications window will look like Figure B3.
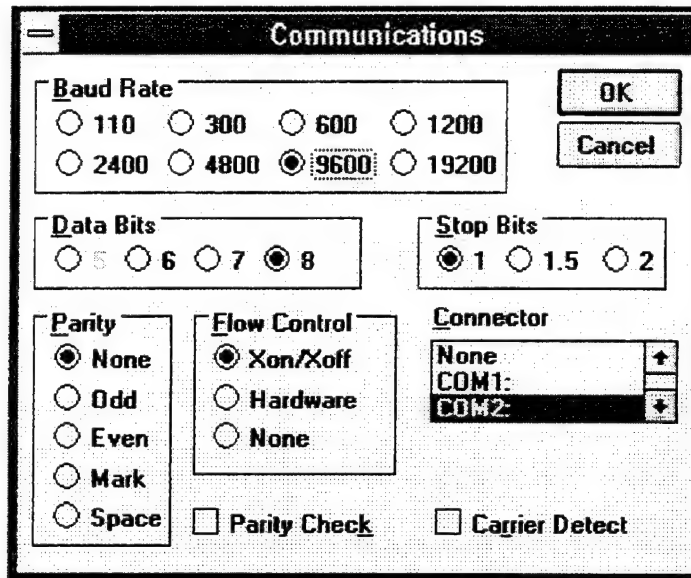
Figure B3. Communications window.

5. Set the Baud Rate and Connector settings to match your system. Other settings should be fine (8 Data Bits, 1 Stop Bit, Parity None, Flow Control Xon/Xoff).

6. Click on OK.

7. Click on Phone in the Terminal window.

8. Click on Dial. The Phone Number window, Figure B4, will open.
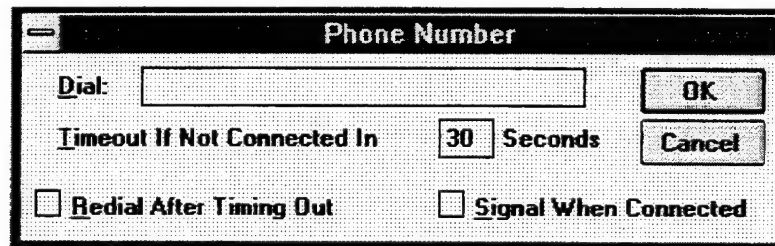
Figure B4. Phone number window.

9. Place the cursor in the Dial window, click. Type **656-2709** (32 ports are available).

10. Click OK, Modem starts dialing and the Terminal window, Figure B5, appears.
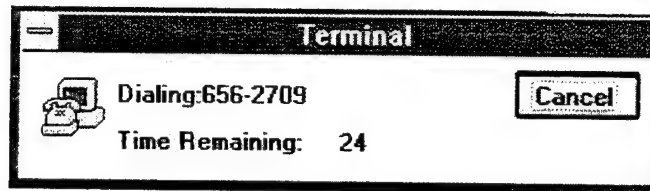
Figure B5. Terminal window.

Once connected, the warning screen appears followed by the Login prompt. Log in just as if you were in the computer center using your same *username* and *password*.

11. Type *username* ⌐ENTER⌐. Your *username*. The Password prompt will appear.

12. Type *pwpwpw* ⌐ENTER⌐. Your *pwpwpw*. The TSB> prompt will now appear.

13. Enter any of the addresses found at the bottom of this page. For example:

in50201.cc.nps.navy.mil ⌐ENTER⌐.

You will be prompted once again for your *username* and *passsword*.

14. Type *username* ⌐ENTER⌐.

15. Type *pwpwpw* ⌐ENTER⌐. You are now fully connected. Complete the tutorial from home, just as if you are sitting at a terminal in the computer center.

When finished:

16. Type **logout** ⌐ENTER⌐. This closes your UNIX account.

17. Click on Phone in the Terminal window.

18. Click on Hang-up. Your connection to NPS is terminated.

Location/Names/IP Addresses of Sun Public Workstations (Partial List)

Ingersoll-141:		Root-222:	
in50201.cc.nps.navy.mil	131.120.50.201	ro140201.cc.nps.navy.mil	131.120.140.201
in50202.cc.nps.navy.mil	131.120.50.202	ro140202.cc.nps.navy.mil	131.120.140.202
in50203.cc.nps.navy.mil	131.120.50.203	ro140203.cc.nps.navy.mil	131.120.140.203
and so on until....		and so on until....	
in50217.cc.nps.navy.mil	131.120.50.217	ro140214.cc.nps.navy.mil	31.120.140.214

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APPENDIX C. UNIX COMMANDS

UNIX commands are case sensitive

^C	**Control C - PANIC KEY - stops a process**
cal	Displays a current month calendar
cat *file 1 >> file 2*	Concatenates (appends) file1 to the end of file2
ccmsgs	Gives latest messages from the computer center
cd	Change directory - moves to your home directory from anywhere
cd *dirname*	Changes directory to directory named *dirname*
cd ..	(space after cd) moves you to the parent directory one directory up
clear	Clears the screen
cp *filename dirname*	Copies a file to a directory
cp *oldfilename newfilename*	Changes the filename
date	Displays the current date and time
eject	Ejects a 3.5" disk from the disk drive
exit	Closes a window
finger *username(@address)*	Shows information on individual accounts
kill *processid#*	Stops *process#* found after executing the ps command
logout	Logs you off and ends your session
lp *filename*	Prints *filename*
lpq	Shows status of printer
lprm *job#*	Removes the print job# found after executing the lpq command from the print queue
ls	List, displays contents (files & directories) of the present working directory (pwd)
ls -a	List -all. Displays contents of pwd including hidden dot files
ls -l	List -long. Displays pwd contents with file size, date, time

man *command* .... **Man**ual - opens the UNIX manual, gives a
description of *command*

mkdir *dirname* .... Creates a new directory with name *dirname*

more *filename* .... Displays the contents of a file one screen at a time

mv *filename dirname* .... **Mov**es a file to a directory

mv *oldfilename newfilename* .... Renames a file

pwd .... **P**rint **w**orking **d**irectory - displays the pwd with the
full path

ps .... Displays the current process

rlogin *machine address* .... Allows you to remotely login to another machine

rm *filename* .... **Rem**oves (deletes or erases) a file

rmdir *dirname* .... Removes (deletes or erases) a directory (directory
must be empty)

software .... Lists software that's available on computer center
workstations

whatis *command* .... Displays a one-line summary about the *command*

who .... Displays who is logged in and where

yppasswd .... Allows user to change their password

APPENDIX D. EMAIL, FTP, TELNET, GOPHER COMMANDS

1. EMAIL

?	Displays a list of UCB mail commands
d *message#*	Deletes a message
e *message #*	Edits message #
h	Displays a list of up to 20 messages
m *useraddress*	Allows you to send a new message while reading a message
mail	Starts the UCB mail program
mail -f *filename*	Allows you to read a saved message and reply to it
more	Allows you to read additional screens of a long message (page down)
lpn	Prints message #
q	Quits UCB mail program and moves all read messages to a file called mbox in your home directory
R *message #*	Reply is sent to everyone who received the message you are replying to
r *message #*	Reply is sent to sender only
s *message # file*	Appends *message #* to *file*
s message# dirname newfilename	Saves a *message* in directory *dirname* as *newfilename*
t *message #*	Type *message #* (same as print)
x	Exits UCB mail program as if you never entered it. If you deleted a message it is still there
z+	Scroll forward in a list of messages
z-	Scroll backwards in a list of messages

2. FTP

ascii	Sets the transfer mode to ascii(same as text file)
bin	Sets the transfer mode to binary (for all files other than ascii files)
bye	Closes ftp connection
cd ..	(space after cd) moves you to parent directory, the one directly above the one you are in
dir	Displays the contents of a directory
get *filename*	Retrieves the file *filename*
get *remotefilename newfilename*	renames a downloaded file
help	List of ftp commands
mget *filename filename*	Retrieves multiple files (separate filenames with a
space; can use	wildcards also)
pwd	Print working directory - displays the pwd with the full path
quit	Exits ftp program

3. TELNET

close	Closes the connection and exits the telnet program
^]	(Control]) returns you to the telnet prompt

4. GOPHER

a	Adds an item to the bookmark list
d	Deletes an item from the bookmark list
gopher	Connects you with the local Gopher server
gopher *Gopheraddress*	Directly connects you to a remote Gopher server
m	Directs the gopher server to email you a copy of the document you are looking at
s	Saves a file
u	Return to the previous menu
q	Quits gopher

v...access a bookmark list

/ ....Opens a word search dialog box. Enter a key word, gopher will search the menus only for it. Used for large menu screens

= ....Displays address of a menu item that is pointed to

? ....Displays a list of gopher commands

5. ARCHIE

set search sub ....Tells Archie to look for partial words plus whole words

set mailto address ....Tells Archie to email search results to address

set pager ....Allows you see each page vice scrolling of search results

quit ....Disconnects you from Archie server, terminates session

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APPENDIX E. USEFUL INTERNET INFORMATION

1. TRANSFERRING UNIX FILES TO YOUR HOME PC

You will soon or later want to retrieve a file to be used on your PC at home. A
3.5" disk drive is located on the right side of your workstation. To eject a disk, you must
type **eject** E. Your PC is probably using MSDOS so you will need to convert your UNIX
files to DOS files. *Mtools* is a set of UNIX commands that allows DOS interface. The
commands themselves are simply the DOS command with the letter "m" in front of them.
The commands you need are:

mcd........change MSDOS directory	mcopy.....copy MSDOS files to/from UNIX
mdel ......deletes an MSDOS file	mdir ....displays an MSDOS directory
mmd ......makes an MSDOS directory	mrd.........removes an MSDOS directory
mren ......renames an MSDOS file	mtype ......displays contents of MSDOS file

To copy a file from UNIX to your 3.5" disk, you would type: **mcopy** *filename* a:
E. Mtools will rename the file for you unless you type: **mcopy** *filename* a:
newDOSfilename. Wildcards can be used also. Your disk should already be DOS
formatted. If your disk is 720 K, use the a: address. If it is 1.44M, use the b: address.

2. NETSPEAK

Here are a few common acronyms that will make you look like a salty Internaut:

IMHO = In My Humble Opinion	FYI = For Your Information
BTW = By The Way	TIA = Thanks In Advance
RTFM = Read The Friendly Manual	FAQ = Frequently Asked Question
PLOTKA = Press Lots Of Keys To Abort	HTH = Hope This Helps

3. COMMON FILE EXTENSIONS

.cpt compressed	.sit compressed	.arc compressed	.arj compressed
.zip compressed	.pak compressed	.Z compressed	.gz compressed
.voc sound	.wav sound	.snd sound	.tar archive
.ps postscript	.gif graphics	.txt text	.jpg image
.tif image	.mpg video	.au audio	.xbm image

APPENDIX B. TUTORIAL SURVEYS

PRE-TUTORIAL SURVEY

Name_____

Email address_____

Curriculum #_____

Part I

1. Do you own a personal computer (PC)?
    ( ) No
    ( ) Yes

2. If so, does your PC have a modem and telecommunications software installed?
    ( ) N/A
    ( ) No
    ( ) Yes

3. Do you access any of your NPS accounts from home via modem?
    ( ) N/A
    ( ) No
    ( ) Yes

4. Have you ever used the Internet for electronic mail?
    ( ) No
    ( ) Yes

5. Have you ever used the Internet for information search and retrieval?
    ( ) No
    ( ) Yes

6. Do you have any Internet experience?

    ( ) No

    ( ) Yes

7. Prior to this survey, did you intend to use the Internet for email?

    ( ) No

    ( ) Yes

8. Prior to this survey, did you intend to use the Internet as a thesis research tool?

    ( ) No

    ( ) Yes

Part II

For each question in this section, assume that you have been asked to perform the specified task. On a scale from 1 to 5, with 1 representing No ability and 5 representing Maximum ability, circle the number that best indicates your ability to perform the task.

1. Create a subdirectory in your UNIX account.

    No Ability   1   2   3   4   5   Maximum Ability

2. Send email to another user.

    No Ability   1   2   3   4   5   Maximum Ability

3. Read email sent to you by another user.

    No Ability   1   2   3   4   5   Maximum Ability

4. Access an NPS Usenet Newsgroup.

    No Ability   1   2   3   4   5   Maximum Ability

5. Use anonymous File Transfer Protocol (FTP) to download a file.

      No Ability 1   2   3   4   5 Maximum Ability

6. Use *Telnet* to connect to a remote host to check the weather and ski conditions.

      No Ability 1   2   3   4   5 Maximum Ability

7. Use *GOPHER, VERONICA* or *JUGHEAD* to search gopherspace for thesis material.

      No Ability 1   2   3   4   5 Maximum Ability

8. Use *Archie* to find the name of an FTP host which carries an electronic book.

      No Ability 1   2   3   4   5 Maximum Ability

9. Use a World Wide Web Browser, such as *Mosaic* or *Netscape*, to tour the Whitehouse.

      No Ability 1   2   3   4   5 Maximum Ability

10. Access your NPS account from home via modem and surf the Net from your living room..

      No Ability 1   2   3   4   5 Maximum Ability

POST-TUTORIAL SURVEY

Name_____

Part I

1. Do you intend to use the Internet for email?
   - ( ) No
   - ( ) Yes

2. Do you intend to use the Internet as a thesis research tool?
   - ( ) No
   - ( ) Yes

3. Was the tutorial too lengthy?
   - ( ) No
   - ( ) Yes

4. Did you use Appendix A. Login From Home?
   - ( ) No
   - ( ) Yes

Part II

For each question in this section, assume that you have been asked to perform the specified task. On a scale from 1 to 5, with 1 representing No Ability and 5 representing Maximum Ability, circle the number that best indicates your ability to perform the task.

1. Create a subdirectory in your UNIX account.

   No Ability   1   2   3   4   5   Maximum Ability

2. Send email to another user.

       No Ability   1   2   3   4   5 Maximum Ability

3. Read email sent to you by another user.

       No Ability   1   2   3   4   5 Maximum Ability

4. Access an NPS Usenet Newsgroup.

       No Ability   1   2   3   4   5 Maximum Ability

5. Use anonymous File Transfer Protocol (FTP) to download a file.

       No Ability   1   2   3   4   5 Maximum Ability

6. Use *Telnet* to connect to a remote host to check the weather and ski conditions.

       No Ability   1   2   3   4   5 Maximum Ability

7. Use *GOPHER, VERONICA* or *JUGHEAD* to search gopherspace for thesis material.

       No Ability   1   2   3   4   5 Maximum Ability

8. Use *Archie* to find the name of an FTP host which carries an electronic book.

       No Ability   1   2   3   4   5 Maximum Ability

9. Use a World Wide Web Browser, such as *Mosaic* or *Netscape*, to tour the Whitehouse.

       No Ability   1   2   3   4   5 Maximum Ability

10. Access your NPS account from home via modem and surf the Net from your living room..

    No Ability   1   2   3   4   5 Maximum Ability

Part III.

On the first two questions, a scale from 1 to 5 is used, with 1 representing No Extent and 5 representing the Maximum Extent. Circle the number that best reflects your opinion.

1. To what extent was the tutorial user-friendly?

    No Extent   1   2   3   4   5 Maximum Extent

2. To what extent did you benefit from the tutorial?

    No Extent   1   2   3   4   5 Maximum Extent

3. Please state any topics covered in the tutorial that you would exclude:

4. Please state any topic that you would expand upon:

5. In the space remaining, please provide any feedback, negative or positive, concerning the tutorial.

APPENDIX C. TUTORIAL SURVEY RAW DATA

PRE-TUTORIAL SURVEY

									QUESTIONS										
	PART I										PART II								
SUBJECT	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9	10
A	Y	N	N	N	N	N	Y	Y	1	1	1	1	1	1	1	1	1	1
B	Y	Y	Y	Y	Y	Y	Y	Y	1	4	4	1	1	1	4	2	4	3
C	Y	Y	Y	Y	Y	Y	Y	Y	4	5	5	4	5	4	3	3	5	5
D	Y	Y	Y	Y	Y	Y	Y	Y	2	4	5	4	2	2	4	3	4	4
E	Y	Y	Y	Y	N	N	Y	N	1	3	3	1	1	1	1	1	1	1
F	N	NA	NA	N	N	N	Y	Y	2	4	4	1	1	1	1	1	1	1
G	N	NA	NA	N	Y	Y	Y	Y	2	3	3	1	2	1	2	2	2	1
H	Y	Y	Y	N	Y	Y	N	Y	5	5	5	5	2	5	5	1	5	5
I	Y	Y	N	N	N	N	Y	Y	2	4	5	1	1	1	1	1	1	1
J	Y	N	NA	N	N	N	Y	Y	3	4	4	1	1	1	1	1	1	1
K	Y	Y	N	N	N	N	Y	Y	1	1	1	1	1	1	1	1	1	1
L	Y	Y	Y	Y	Y	Y	Y	Y	2	5	5	3	2	1	5	3	4	5
M	Y	Y	Y	N	Y	Y	Y	N	1	5	5	3	3	1	1	1	1	4
N	Y	Y	Y	N	N	N	N	N	3	3	3	2	1	2	3	1	3	3
O	Y	Y	Y	Y	N	Y	Y	Y	1	5	5	1	1	3	1	1	4	5
P	N	NA	NA	Y	Y	Y	Y	Y	1	5	5	1	1	1	1	1	5	1
Q	Y	N	N	Y	Y	Y	Y	Y	1	5	5	1	1	1	1	1	4	1
R	Y	Y	Y	Y	N	Y	Y	N	1	5	5	1	1	1	1	1	1	1
S	Y	N	NA	Y	N	Y	Y	N	1	4	4	1	1	1	1	1	1	1
T	Y	N	N	N	Y	Y	Y	Y	1	5	5	1	1	1	1	1	5	1
U	N	NA	NA	N	N	N	N	N	1	3	5	1	1	1	1	1	1	1
V	Y	Y	N	Y	Y	Y	Y	Y	1	3	3	1	1	1	2	1	1	1

POST-TUTORIAL SURVEY

		PART I				PART II										PART III	
SUBJECT	1	2	3	4		1	2	3	4	5	6	7	8	9	10	1	2
A	Y	Y	N	N		3	2	2	2	2	2	2	2	2	2	4	4
B	Y	Y	Y	N		2	4	5	2	2	2	4	4	4	4	3	2
C	Y	N	N	Y		5	5	5	4	5	4	5	4	5	5	3	1
D	Y	Y	N	Y		5	5	5	5	1	5	5	5	5	5	4	4
E	Y	Y	N	Y		3	4	4	4	2	3	3	3	1	3	4	5
F	Y	Y	N	N		4	5	5	4	5	5	4	4	5	1	5	5
G	Y	Y	N	N		4	5	5	4	4	5	5	5	4	1	5	5
H	Y	Y	N	Y		5	5	5	5	5	5	5	5	5	5	5	5
I	Y	Y	N	N		2	5	5	2	2	5	4	4	5	1	4	4
J	Y	Y	N	N		2	3	4	3	2	2	2	2	3	1	3	4
K	Y	Y	N	N		5	5	4	3	3	2	2	3	3	1	3	3
L	Y	Y	N	Y		4	5	5	5	3	4	5	4	5	5	5	4
M	Y	Y	Y	Y		2	3	3	5	2	1	2	3	3	5	2	3
N	Y	N	N	Y		3	3	3	3	3	2	2	2	3	3	4	4
O	Y	Y	N	Y		3	5	5	3	5	5	5	5	5	5	4	4
P	Y	Y	N	N		3	5	5	2	1	4	5	2	5	1	2	4
Q	Y	Y	N	N		1	5	5	1	2	3	5	4	5	2	3	3
R	Y	Y	N	Y		4	5	5	3	4	4	4	4	4	4	4	4
S	Y	Y	N	N		3	4	4	3	2	4	2	2	5	1	4	4
T	Y	Y	Y	N		4	4	4	2	1	1	1	1	3	1	4	4
U	Y	Y	N	N		2	5	5	2	2	4	4	2	3	1	3	4
V	Y	Y	N	N		3	3	4	2	2	3	2	1	3	1	2	3

QUESTIONS

APPENDIX D. SUMMARY OF PRE AND POST TUTORIAL TASK ABILITY

PRE-TUTORIAL

						QUESTIONS					
SUBJECT	1	2	3	4	5	6	7	8	9	10	AVG
A	1	1	1	1	1	1	1	1	1	1	1
B	1	4	4	1	1	1	4	2	4	3	2.5
C	4	5	5	4	5	4	3	3	5	5	4.3
D	2	4	5	4	2	2	4	3	4	4	3.4
E	1	3	3	1	1	1	1	1	1	1	1.4
F	2	4	4	1	1	1	1	1	1	1	1.7
G	2	3	3	1	2	1	2	2	2	1	1.9
H	5	5	5	5	2	5	5	1	5	5	4.3
I	2	4	5	1	1	1	1	1	1	1	1.8
J	3	4	4	1	1	1	1	1	1	1	1.8
K	1	1	1	1	1	1	1	1	1	1	1
L	2	5	5	3	2	1	5	3	4	5	3.5
M	1	5	5	3	3	1	1	1	1	4	2.5
N	3	3	3	2	1	2	3	1	3	3	2.4
O	1	5	5	1	1	3	1	1	4	5	2.7
P	1	5	5	1	1	1	1	1	5	1	2.2
Q	1	5	5	1	1	1	1	1	4	1	2.1
R	1	5	5	1	1	1	1	1	1	1	1.8
S	1	4	4	1	1	1	1	1	1	1	1.6
T	1	5	5	1	1	1	1	1	5	1	2.2
U	1	3	5	1	1	1	1	1	1	1	1.6
V	1	3	3	1	1	1	2	1	1	1	1.5
AVG	1.7	3.9	4.1	1.7	1.5	1.5	1.9	1.4	2.5	2.2	2.2

Average = 2.2
Standard Deviation = 1.6
Variance = 2.5

POST-TUTORIAL

					QUESTIONS						
SUBJECT	1	2	3	4	5	6	7	8	9	10	AVG
A	2	2	2	2	2	2	2	2	2	2	2.0
B	2	4	5	2	2	2	4	4	4	4	3.2
C	5	5	5	4	5	4	5	4	5	5	4.7
D	5	5	5	5	1	5	5	5	5	5	4.6
E	3	4	4	4	2	3	3	3	1	3	3.0
F	4	5	5	4	5	5	4	4	5	1	4.6
G	4	5	5	4	4	5	5	5	4	1	4.6
H	5	5	5	5	5	5	5	5	5	5	5.0
I	2	5	5	2	2	5	4	4	5	1	3.8
J	2	3	4	3	2	2	2	2	3	1	2.6
K	5	5	4	3	3	2	2	3	3	1	3.3
L	4	5	5	5	3	4	5	4	5	5	4.4
M	2	3	3	5	2	1	2	3	3	5	2.7
N	3	3	3	3	3	2	2	2	3	3	2.7
O	3	5	5	3	5	5	5	5	5	5	4.6
P	3	5	5	2	1	4	5	2	5	1	3.6
Q	1	5	5	1	2	3	5	4	5	2	3.4
R	4	5	5	3	4	4	4	4	4	4	4.1
S	3	4	4	3	2	4	2	2	5	1	3.2
T	4	4	4	2	1	1	1	1	3	1	2.3
U	2	5	5	2	2	4	4	2	3	1	3.2
V	3	3	4	2	2	3	2	1	3	1	2.6
AVG	3.2	4.3	4.4	3.1	2.7	3.4	3.5	3.2	3.9	2.6	3.5

Average = 3.5
Standard Deviation = 1.3
Variance = 1.7

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